

THE
SURGICAL CLINICS
OF
CHICAGO

W. J. Fitz

AUGUST, 1918

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WITH 110 ILLUSTRATIONS

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CONTENTS

	PAGE
<i>Clinic of Dr Lewis L. McArthur, Michael Reese Hospital</i>	
TUMOR OF THE PITUITARY GLAND—TECHNIC OF OPERATIVE APPROACH	691
<i>Clinic of Dr Kellogg Speed, Base Hospital in France</i>	
TRANSARTICULAR CAPSULORRHAPHY ON THE KNEE	701
<i>Clinic of Dr Arthur Dean Bevan, Presbyterian Hospital</i>	
HEMANGIOMA OF THE SCALP	713
SKIN-GRAFTING—AN EXTENSIVE BURN OF THE CHEST REPAIRED BY THIERSCH GRAFTS	717
SARCOMA OF LOWER JAW	727
CARCINOMA OF THE LARYNX—TECHNIC OF OPERATION UNDER IN-FILTRATION WITH APOTHESEN	733
<i>Clinic of Dr Carl Beck, North Chicago Hospital</i>	
PARTIAL RHINOPLASTY—TRANSPLANTATION OF SKIN FOR REPAIR OF DEFECT OF TIP OF NOSE BY THE ITALIAN METHOD	739
TREATMENT OF PNEUMONIA OF HANDS AND FINGERS	745
<i>Clinic of Dr Daniel N. Eisendrath, Cook County Hospital</i>	
THE ACUTE ABDOMEN—A CLINICAL LECTURE	751
<i>Clinic of Dr Wesley J. Woolston, Cook County Hospital</i>	
MALIGNANT DISEASE OF THE CERVICAL STUMP AFTER SUPRAVAGINAL HYSTERECTOMY	771
<i>Clinic of Dr Edward L. Moorhead, Mercy Hospital</i>	
A SHOW CLINIC—PRESENTATION OF FIVE CASES	779
<i>Clinic of Dr Harry Culver, Cook County Hospital</i>	
PYELONEPHRITIS	797
<i>Clinic of Dr Louis E. Schmidt, Alexian Brothers Hospital</i>	
OPERATIVE TREATMENT OF URETHRAL FISTULA	811
TECHNICAL ERRORS IN THE OPERATIVE TREATMENT OF URETHRAL STRICTURE	815
<i>Clinic of Dr Herman L. Kretschmer, Presbyterian Hospital</i>	
FULGURATION TREATMENT OF TUMORS OF THE BLADDER	821
FULGURATION TREATMENT OF URETHRAL CARUNCLE	833
<i>Clinic of Dr William Hessert, Alexian Brothers Hospital</i>	
A SURGICAL CLINIC ON FRACTURES	835
<i>Clinic of Dr George D. J. Griffin, Mercy Hospital</i>	
A GENERAL DISCUSSION OF FRACTURES	881

SURGICAL CLINICS OF CHICAGO

Volume 2

Number 4

CLINIC OF DR L L MCARTHUR

MICHAEL REESE HOSPITAL

TUMOR OF THE PITUITARY GLAND—TECHNIC OF OPERATIVE APPROACH

Summary Patient thirty five years of age who has been suffering from severe headaches at intervals for two years. Diagnosis based on symptoms of intra cranial pressure and the x-ray findings. Operation the McArthur frontal approach. postoperative course.

THIS patient B D, aged thirty five, was referred to the operator by Dr Hugh T Patrick. The patient's general health through life has been good. Two years ago he suffered with severe headache, which was always frontal in character, not unilateral, unaccompanied by vomiting. He is a heavy smoker, but uses no alcohol.

While the patient is being prepared I shall read abstracts of the reports of the neurologists and other specialists who have studied this case and assisted in making the diagnosis.

May 17, 1918. At Michael Reese Hospital. Had x ray pictures taken, which showed decided excavation of sella turcica. Ocular examination at that time revealed a left hemianopsia. Dr Sidney Kuh, after examination, regarded the condition as nervous breakdown, advised against operative interference.

In August 1917, was operated upon by Dr R H Good for left frontal sinus disease finding same purulent. After enlarging the duct sinus washed out two or three times weekly, headache was alleviated very much.

Letter of reference by Dr Hugh T Patrick, viz "I think there can be little doubt that patient has a tumor of the hypophysis. The symptoms point to it and the x ray plates show large excavation of the sella with disappearance of the posterior

CONTENTS

Clinic of Dr Lewis L. McArthur, <i>Michael Reese Hospital</i>	PAGE
TUMOR OF THE PITUITARY GLAND—TECHNIC OF OPERATIVE APPROACH	691
Clinic of Dr Kellogg Speed, <i>Base Hospital in France</i>	
TRANSARTICULAR CAPSULORRHAPHY ON THE KNEE	701
Clinic of Dr Arthur Dean Bevan, <i>Presbyterian Hospital</i>	
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Clinic of Dr Carl Beck, <i>North Chicago Hospital</i>	
PARTIAL RHINOPLASTY—TRANSPLANTATION OF SKIN FOR REPAIR OF DEFECT OF TIP OF NOSE BY THE ITALIAN METHOD	739
TREATMENT OF PELEGMON OF HANDS AND FINGERS	745
Clinic of Dr Daniel N. Eisendrath, <i>Cook County Hospital</i>	
THE ACUTE ABDOMEN—A CLINICAL LECTURE	751
Clinic of Dr Wesley J. Woolston, <i>Cook County Hospital</i>	
MALIGNANT DISEASE OF THE CERVICAL STUMP AFTER SUPRAVAGINAL HYSTERECTOMY	771
Clinic of Dr Edward L. Moorhead, <i>Mercy Hospital</i>	
A SHOW CLINIC PRESENTATION OF FIVE CASES	779
Clinic of Dr Golder L. McWhorter, <i>Presbyterian Hospital</i>	
SURGICAL TREATMENT OF NEEDLES IN THE HAND	787
ISOLATED AND COMPLETE DISLOCATION OF THE FIFTH CARPOMETA-CARPAL JOINT OPEN OPERATION	793
Clinic of Dr Harry Culver, <i>Cook County Hospital</i>	
PYELONEPHRITIS	797
" " " " " " " " " " " " " " " "	811
" " " " " " " " " " " " " " "	815
Clinic of Dr Herman L. Kretschmer, <i>Presbyterian Hospital</i>	
FULGURATION TREATMENT OF TUMORS OF THE BLADDER	821
FULGURATION TREATMENT OF URETHRAL CARUNCLE	833
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as to the removal of the bone in two pieces instead of in one. The desirability of a route by which a good view and an aseptic field for operation are obtainable cannot be questioned. Hence to the general surgeon any operation done through the nose or mouth is objectionable on both the limited field of vision basis and the septic tract through which the operation must be performed.

If one will examine a skull the top of which has been removed one will see at a glance that if the frontal prominence with the supra orbital ridge be removed one can easily reach with an in-



Fig. 217 — Line of skin incision

dex finger the site of the pituitary body. Briefly the technic of the operation is as follows:

Technic —The surface having been prepared and sterilized and the eyebrow having been shaved an incision is made from the midline in a horizontal direction following the curve of the eyebrow and made in the hair line to the outer extremity of the orbit then a perpendicular incision is made in the middle line of the forehead to the hair line and then curved outward to the same side cutting everything down to the bone (Fig. 217). It is then possible to reflect a flap of the soft tissues with the periosteum included. With this soft tissue flap retracted laterally

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Fig. 21 —Line of skin incision

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one then makes a small button perforation at the upper portion of the exposed frontal bone through which it is possible with the DeVilbiss forceps to make a curved cut in the bone that will extend from the internal orbital angle upward and outward and

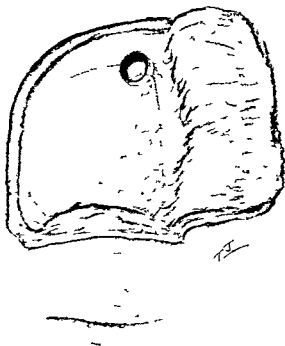


Fig. 218—Flap of soft tissues retracted laterally, outline of bone shown and button perforation of bone removed to afford point of application for the DeVilbiss forceps

downward to the external orbital angle (Fig. 218). When this has been cut the supra-orbital arch is then divided obliquely by means of a small circular saw or osteotome so that when replaced it will act as the keystone of an arch which has at either end an oblique support.

When this has been done it is possible to pry out the fragment of bone outlined and with it will come the greater part of the roof of the orbit. Before prying it out however the periosteum lining the roof of the orbit should have been carefully loosened from the bone in order that the structures contained within the orbit will still be protected by its periosteal envelope. When this piece has been removed it should be placed in normal sterile salt solution and carefully maintained at blood heat until ready for replacement at the conclusion of the operative interference. On its removal there will come into view the anterior portion of the frontal lobe of the brain with its dural covering. In this particular instance notwithstanding the fact that careful investigation had been made of the frontal sinus which sinus had been under treatment for some months having been drained through the enlarged nasal duct we find it to be filled with pus and must discontinue our operative interference until this septic process has been destroyed. To do this we will remove the posterior bony wall of the frontal sinus all of its lining mucous membrane and pack with iodoform gauze in such a way that the end of the packing can be removed through the nasal sinus it being deemed inadvisable to open the dura in the presence of a suppurative process.

(Three weeks later the patient being free from all temperature and with no discharge from the nasal duct leading to the remains of frontal sinus the wound was reopened the fragment of frontal bone again elevated and put in salt solution and the frontal sinus found to have been obliterated by a mass of granulation tissue completely filling same. The operation was therefore proceeded with at the point at which it had been arrested by the finding of pus within the frontal sinus.)

In order to secure good exposure the balance of the roof of the orbit well back to the exit of the optic nerve is easily removed by means of small rongeur forceps which bite off the bone piece by piece care being taken all the time not to injure the periosteum which has been detached from the bone before its removal (Fig. 219). When this is accomplished it is then feasible with an ordinary teaspoon or orange spoon to depress the contents of

the orbit very considerably, and with a teaspoon table-spoon or other brain retractor it is possible to so elevate the frontal lobe encased in its dural covering as to gain a view of the corresponding optic nerve within the cranium. With this as a guide further gentle loosening of the dura enables one to feel

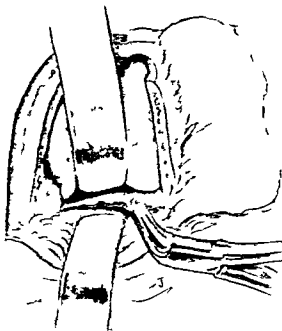


FIG. 719.—Roof of orbit removed by means of the retractor. Dura elevated and orbital contents depressed with the retractors.

with the finger the entire free edge of the phenoid wing and with this means of orientation to recognize the anterior clinoid process. With gentle handling and sponging of the small amount of venous oozing one will soon perceive the opposite optic nerve coming into view with its dural covering. Having the frontal

lobe so elevated and exposed and having the anterior margin of the sella turcica localized one makes a transverse incision in the dura about 1 cm in front of the position of the chiasm (Fig 220) When this is made not infrequently considerable of the cerebrospinal fluid escapes from the cisterna With this mopped out it is possible to see the horizontal diaphragm of

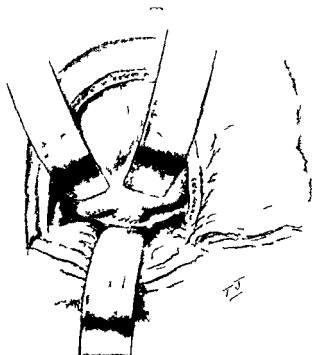


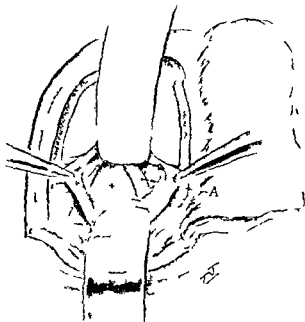
Fig. 220—Site for incision in dura

dura covering in the pituitary body when normal—the convex elevation of the same when distended and pushed upward by a pituitary tumor (Fig 221)

We have been fortunate in having an artist with us who at the various stages of the operation has been given an opportunity to make sketches of them He will for the purposes of future

illustration complete these for the records. The drawings therefore will not be schematic but will be as actually seen.

With our dura open and the frontal lobe elevated the orbital contents depressed by means of an ordinary teaspoon we are able to see both optic nerves and their junction in the chiasm. we are able to see the cerebral artery but find neither in the sella



F 1—Dura incised to Optic nerve + posterior at a knob just below

tubercle nor in that portion of the frontal lobe lying in immediate contact there with any abnormal structure and must therefore desert the probable localization as determined by the left hemianopsia having been faulty. An attempt is made at opening the dura the frontal lobe and dura are allowed to fall upon the periotome covering the orbital contents the bony fragment

replaced and the periosteum sutured over it. A silkworm gut drain brought out at the inner angle of the incision and closure by continuous suture of the wound completes the exploration.

Postscript—Healing *per primam*, stitches removed on the sixth day, and now five weeks after the operation the only wound to be seen is the perpendicular mesial red line extending



Fig. 222. X-ray picture of skull five weeks after operation. There are as yet very few signs of bony closure of the tract made by the DeVilbiss forceps.

upward to the hair which covers the lateral arm of the incision, the eyebrow having grown out covering the supra-orbital incision. An X-ray picture taken at this time shows the outline of the bone fragment which was removed in order to afford access to the pituitary. As yet there is but little evidence of bony bridging of the line of incision (Fig. 222).

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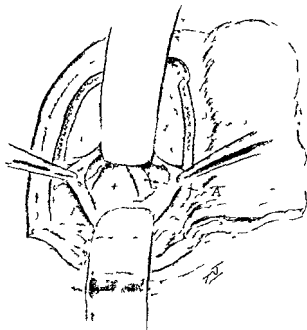


Fig. 221.—Dura incised. — Optic nerve. + point for attacking hypophysis.

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CLINIC OF DR KELLOGG SPEED

BASE HOSPITAL IN FRANCE

TRANSARTICULAR CAPSULORRHAPHY ON THE KNEE

Summary A day in the operating theater of a Base Hospital in active service—necessity of speedy, accurate decisive grouping of patients—the omnipresent sepsis the first patient—a gunshot wound of the knee—necessity of immediate application of splints in knee injuries technic of examination and operative treatment in present case suspension of the leg a great convenience the dressings subsequent clinical course

A DAY in the operating theater for the clinical surgeon on active service is not so much unlike a day in his own hospital at home That means, of course that all his resources, both mental and physical, are on tap During his operative hours, which cannot be too long in these days of continued battle, he is intensely occupied with technical work Diagnostic acumen must be sharper than in peaceful times because under the present circumstances many of the men to be operated on are not seen by the surgeon until they are on the table Decisions governing choice of anesthetic wisdom of operating on any given wound, and the method of choice must be made quickly So great is the pressure that the operator must abandon his civil habits—he cannot see his patients the night before, make careful physical examination, and require helpful laboratory tests If medical officers have passed on the necessity for operation and sent the patient to the theater, their decision must be accepted up to that point

The patients are easily divided into three groups—those received shortly after injury, on whom early radical excision and operation for foreign body removal may be practised, and those received too late for such steps, who must be cared for by foreign body removal with indicated drainage The gas infections and secondary hemorrhages are in a class by themselves

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request for two way skiagrams and x ray localization of our joint, chest and head injuries and we have the plates here. Even if they were not available it seems better to excise this wound to close and protect the joint immediately, than to put off that step until the joint is hopelessly infected. An experienced surgeon will usually find foreign bodies without x ray assistance but unless it is absolutely impossible he should be



Fig. 223—Lateral view showing foreign body hugging the femur and the hole in the shaft through which it passed after traversing joint.

furnished that aid. His work is then more rapid and far less destructive.

Examination of the plates shows that the foreign body lies just alongside the femur on the inner border of the shaft above the supracondylar expansion of the bone (Figs. 223 and 224). The localization ring is here right over the bone and the depth mark is just at the femur level. The operating procedure is clearly indicated. We know there is a retained foreign body, we

The former require subdivision into three classes, those still localized, favorable, those complicated by septicemia, and those not accompanied by general reaction, which are not favorable for operation

The surgeon, then, must weigh many considerations, but beneath all he must consider the omnipresent sepsis which threatens all patients. Each day's work means decisions for and against amputation, looked at in the light of war experience with sepsis, questions of the advantage or disadvantage of exploration near blood vessels, of the advisability of skull and brain operations, and the intense necessity of closing open joints against infection arising around them

Rapidity in operation is even more desirable than in civil work. The time of the operating room force must be conserved. One ordinary operator with bandaging assistants and two anesthesiologists can easily keep three tables going. Minor operations, especially those requiring only gas anesthesia, can be sandwiched in between more serious ones, so that it is no great effort for a trained surgeon to care for 20 patients in the course of a morning.

The first patient this morning, with a gunshot wound of the knee, is one of the type on whom we like to operate as soon as possible after their arrival. He is J. C., 18 088, Gnr — Bde, RFA, injured just forty-eight hours ago, passed through a field ambulance and sent down to us at once, with no more attention than a dressing and a Thomas splint—the very best treatment possible. Knee-joint injuries no matter how slight they appear, should always be splinted at once. Operative treatment should follow as soon as consistent with existing conditions, and the patient should never attempt to walk until he is recovering and given medical permission.

When we examine the knee we find the wound of entrance just above the patella in the middle line. There is no exit. The joint is slightly distended and is a little tender, and from the appearance of the ragged edges of the wound it seems that a piece of shell was the cause. No matter which way that fragment went after entering the tissues, it must surely have penetrated the subcutaneous pouch of the joint. We make urgent

pare the patient. War is no respecter of human anatomy—we must make easy our method of preparing any part of the leg.

The skin has now been shaven from mid thigh to mid leg and after washing with methyl alcohol a 5 per cent solution of

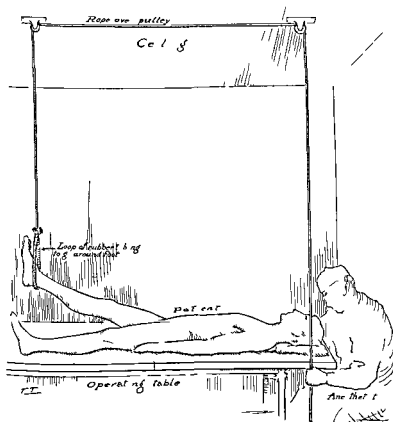


Fig. 225. Method of suspending leg to minimize number of necessary assistants both in the scrubbing up and in the actual operative work. By thus suspending the limb, greater freedom of movement is obtained and contamination of the wound by contact is also lessened.

picric acid in alcohol is painted on and allowed to dry. A constrictor is then tightened about the thigh and the operative field is protected by towel while the leg is still in suspension.

know where it is we are also reasonably certain that the joint has been perforated and that it still remains without noticeable infectious reaction. Our indications are to excise this soiled wound of entrance down to the joint to determine the condition of the joint and remove any untoward foreign contents to close the joint and entrance wound and then to make a separate



Fig. 224—Anteroposterior view showing foreign body in inner femoral shaft after having pierced the bone.

incision through the inner side of the lower thigh and remove the foreign body.

The orderly is using ether soap on the soiled skin of the leg and thigh. You note that we hold the whole leg up off the table with a rubber tubing.

One orderly can hold the leg at any angle of elevation is obtained and then proceed alone to pro-

pare the patient. War is no respecter of human anatomy—we must make easy our method of preparing any part of the leg.

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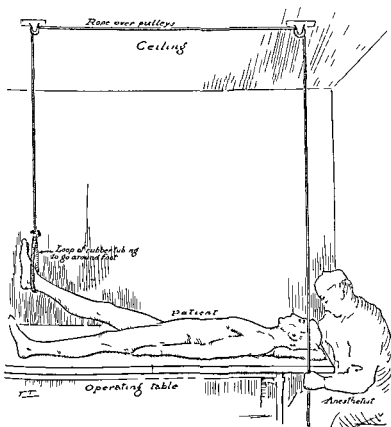


Fig. 22b.—Method of suspending leg to minimize number of necessary assistants both in the scrubbing up and in the actual operative work. By thus suspending the limb greater freedom from possible contamination of the wound by contact is also obtained.

puric acid or alcohol is painted on and allowed to dry. A constrictor is then tightened about the thigh and the operative field is protected by towels while the leg is still in suspension.

know where it is, we are also reasonably certain that the shell has been perforated and that it still remains without a greater reaction reaction. Our indication are to expose the site wound of entrance down to the joint to determine the character of the joint and remove any untoward foreign material to clear the joint and entrance wound and then to make a repair.



FIG. 1. A. The point of entry of the bullet into the body of the victim. B. The point of entry of the bullet into the body of the victim.

incision through the inner side of the lower thigh and remove the foreign body.

The order is to make either soap or the water bath the last and then. You note that we have the whole leg upon the table by means of an admirable overhead line with a rubber band loop to hold the foot of the patient and Fig. 22. One order can then express the whole limb to the rope so that any desired angle of elevation is obtained and then proceed again to pre-

(Fig 227) Beyond that I cannot see Before going further let us pick up this deeper hole and trim the torn edge of the synovial surface about it Having done so I am going to use my other eyes—the index finger of my left hand, which I pass gently through both the synovial openings Beyond I feel a hole punctured clear into the femoral shaft but with the advantage of

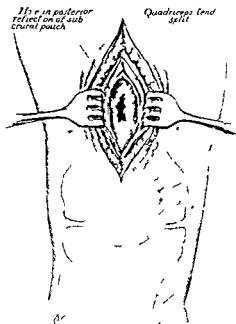


FIG. 227.—Subcrural bur-a-lai: pen the hole in the underlying femur is brought into view

my x ray information I know that the missile has passed clear through the bone and now lies just beyond it (Fig 228) Without attempting to clean the hole in the bone, which would mean the dragging of potentially infected material up through the joint for delivery I am going to adopt a method I frequently employ under similar circumstances namely I shall do a trans articular capsulorrhaphy on this hole in the deep reflection of

Early and careful exploration of the knee joint should always be done with a constrictor on the thigh, and with the leg swung up, thus there is little or no possibility of contact with table or rubber sheet and the joint itself can be fully exposed by necessary incisions without risk of moving and irritating it. Sponging is unnecessary and the rapidity of the work is greatly enhanced.

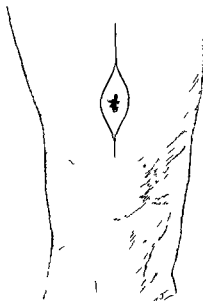


Fig. 226.—Contaminated wound of entrance on cartilage through clean tissues

My incision extends from the upper border of the patella toward the top of the subcrural pouch going around the wound of entrance the soiled tissues of which are cut away clear down to the synovial surface (Fig. 226). Now I turn the synovial surface, and the joint within looks clean and healthy. Gentle retraction which does not impinge on the synovia demonstrates a second hole in the lower reflection of the subcrural pouch.

the punctured wound or from the clots—this will be cleansed mechanically and very gently by the salt solution. Granted that the joint might remain sterile without operation removal of the clots and lavage of the synovial surface will go far toward avoiding the formation of intra articular adhesions. If sepsis develops within the joint clot removal should favor a less extensive process because the joint surfaces will tend to lie in apposition and prevent the spread of the infection.

The joint irrigation is finished and I am closing the hole in the upper synovial surface of the subcrural pouch. After that the cut away edges of the quadriceps tendon and muscle are closed separately and lastly the skin is brought together—three rows of protection in front of that joint and its posterior wall closed off from the missile's tract into the bone. If the infection has not great headway—and it did not show any such signs to our inspection—we expect that joint at the very least to take care of itself and its usefulness to be conserved. After caring for several hundreds of these patients we know that is entirely reasonable to anticipate. We may expect a smooth recovery and a functioning joint in 80 per cent of early operated knee penetrations.

Through a separate incision on the inner lateral surface of the thigh I very quickly come down to and extract the foreign body—here it is. This second incision I shall not close at all—if there is a development of sepsis here I wish it to empty itself out through this opening—not to press forward on the bone nor against the joint threatening it.

The dressings are applied and now we come to one of the most important steps in the treatment—the application of the Thomas splint. The leather padded ring of the splint must be of a size 2 inches larger than the measurement of the upper thigh to allow for the pads and the diagonally set ring. Supports of perforated zinc stiffened by a piece of Gooch splint and padded with shell dressings hold up leg and thigh on to the side pieces of the splint. To steady the limb we use a mild traction gauze applied to the sides of the leg held by Sinclair's

the subcrural pouch and then—and not until then—will I wash out the joint. You saw the large clots I gently lifted out when I first opened the joint. When the deep hole is closed by this catgut stitch I can wash out the joint with normal salt solution without leakage from the articulation pouch into the t. ue-

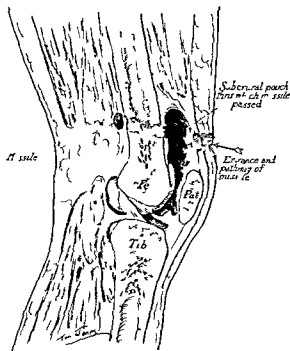


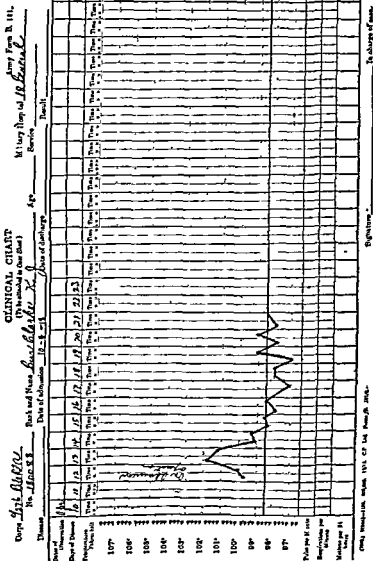
Fig 2.8—Tract of missile and its final location. It has passed through the quadriceps tendon, the subcrural bursa and the femur into the popliteal space.

behind and without the possibility of solutions which have penetrated deeper filtering back into the joint. You must recall that the anterior opening has been completely excised until there are present no soiled tissues which have come in contact with the missile and which were infected by it. The only contamination present on the synovial surface is that from continuity of

glue¹ and tightened at the end of the splint. More pads on top and two snug flannel roller bandages hold everything firmly. A foot support is applied and the foot is padded and bandaged comfortably in a right angle position.

Clinical Course—A glance at the temperature chart shows the sudden rise of fever just after operation and its prompt subsidence (Fig. 229). There was little pain in the rigidly held limb. Stitches were removed on the tenth day; the skin was healed and the joint was negative. The patient contracted a slight cold in the ward which deferred his departure to England but he left a few days later in excellent condition with every prospect of ultimate normal function in his knee.

¹ Ordinary glue (gelatin when glue is not obtainable) 50 parts, water 50 parts, glycerin 2 parts, calcium chloride 2 parts, thymol 1 part. Heat glue to 100° F. in water bath.



CLINIC OF DR ARTHUR DEAN BEVAN

PRESBYTERIAN HOSPITAL

HEMANGIOMA OF THE SCALP

Story A child ten months of age dying of hemorrhage from a huge ulcerating hemangioma of the scalp treatment by ligation of common carotid artery and internal jugular vein of the affected side later history of treatment of remnants of tumor by injections of boiling water

May 6 1918

I WANT to present to you this morning a rare emergency. This child about ten months of age is dying from hemorrhage from an ulcerating hemangioma of enormous size involving the entire right side of the skull and neck (Fig 230). The hemoglobin is about 35 per cent. The hemorrhage has persisted for the last ten days and cannot be controlled by pressure which if sufficiently firm simply extends the ulceration. As you see the bleeding surface is on the back of the neck and behind the right ear.

I am going to undertake a very unusual and heroic method of treatment in this case and one which undoubtedly carries a very great risk to the child. I believe however it is warranted by the fact that unless you can check this hemorrhage the child will surely die within the next few days. Under ether anesthesia I am going to ligate the common carotid artery and the internal jugular vein on the right side. This will control both the arterial and venous circulation of the area occupied by this large hemangioma. It will of course carry a very great risk of cutting off the circulation of the right side of the brain and producing death from brain softening. The operation of ligating the common carotid and internal jugular vein is formidable not because of any difficulties in technic but because of the enormous risk of cutting off the brain circulation and producing death from brain necrosis. The technic of the operation is comparatively simple.

the artery first so as to cut off the arterial circulation and allow a brief period to intervene, so that the venous channels can empty themselves before ligating the internal jugular vein. I now in the same way ligate the internal jugular vein, and then close the wound with fine catgut buried sutures and silk through the integument. No drainage is employed.

No apparent impression is made upon the child while it is under the anesthetic from this double ligation. Our only hope in this case is that the circle of Willis is sufficiently free from the left side to carry nourishment to the right side of the brain.

After-history—The child went on to a good operative recovery without any cerebral symptoms appearing. The hemorrhage from the ulcerating hemangioma ceased. The very thick spongy hemangioma changed very perceptibly in character within twenty-four hours to a hard, firm mass, caused by the coagulation of blood in the large vessel spaces in the tumor. This coagulation extended throughout the entire mass with the exception of a small area at the upper and inner angle of the right eye. Here there was no change whatever in the character of the hemangioma, due evidently to the fact that the circulation which was derived from the vessels coming out from the orbit, the supra-orbital vein and artery, was not controlled by the double ligation. The ulcerating area of the hemangioma healed very slowly and there was for a number of weeks a marked tendency for the tissues to break down, evidently because of the very limited blood supply of the tissues after ligation. Gradually this condition improved. The blood clot in the tumor was gradually absorbed and the integument over the tumor, which before operation was bluish in color, gradually whitened out and the entire hemangioma with the exception of the limited area supplied by the supra-orbital vessels gradually disappeared (Fig. 231).

The problem then remained of handling that part of the hemangioma at the upper and inner angle of the orbit. I decided to do this with injections of boiling water. It was necessary to repeat these injections three different times, using about 60 minims in each injection, putting in probably 30 minims in two different localities in the tumor at each sitting. This was done

We have protected the ulcerating area with sterile dressings after touching the raw surface with tincture of iodin. The field of operation is prepared simply with soap and water and alcohol. I make as you see an incision along the inner border of the sternocleidomastoid and extending from the thyroid cartilage down about 3 inches which in the short neck of this child brings it almost to the sternoclavicular articulation. I now divide in addition to the skin and superficial fascia the platysma and deep cervical fascia. Drawing the sternocleidomastoid to the outer



FIG. 230



FIG. 231

Fig 230—Huge ulcerating hemangioma of the scalp before operation.

Fig 231—Ten days after operation. The tumor rapidly disappeared, with the exception of the port on above the inner canthus of the right eye. This was later obliterated by injections of boiling water.

side I now expose the sheath of the great vessels of the neck. running in front of this is the descending hypoglossal nerve which is readily recognized and avoided. The common carotid is easily exposed overlapped as it is by the huge internal jugular vein, the jugular vein in this child's case being as large as my index finger.

I now pass an aneurysm needle under the common carotid being sure that I expose it fully and do not injure the pneumogastric nerve which is just behind it. I ligate it with medium sized catgut ligatures. It is well in a case of this kind to ligate

SKIN-GRAFTING: AN EXTENSIVE BURN OF THE CHEST REPAIRED BY THIERSCH GRAFTS

Summary A child, seven years of age, who had suffered a third degree burn of the entire anterior surface of the chest four months previously necessity of skin grafting autogenous grafts indispensable sterilization of the field to be grafted the Thiersch graft—how prepared method of application to raw surface, superiority of dry dressings

May 10, 1918

I WANT to present to you today the case of a little girl, seven years of age, who four months ago was very badly burned by her clothing catching fire. The burn extended over the entire anterior surface of the chest and abdomen to the umbilicus, the anterior surface of the neck up to the chin, and the anterior surface of the shoulders and upper arm to a point about midway between the shoulder and elbow. She was fortunately in the hands of a very competent medical man who took immediate charge and by good management saved the child's life. The burn for the greater part of its extent was of the third degree, destroying completely the integument, and after the sloughs of dead skin came away there was an area probably 12 by 15 inches in extent completely denuded of integument. After the separation of the sloughs the area exposed was treated by paraffin dressings. These gave her a good deal of relief, but had the disadvantage of retaining a lot of pus on the surface, from which she had an absorption temperature ranging from 101° to 102° F. The dressing of the wound was a very serious matter because it was very painful, and the child was very nervous and struggled and protested during the dressings. When the dressings were changed to moist boric dressings, so as to pick up the suppuration, the temperature would fall to approximately normal, but these moist dressings were very painful to the child and had to be discontinued.

Several weeks after the immediate danger of death from the burn had passed, the area was skin grafted, the skin grafts being

without anesthetic and with a syringe especially constructed for this purpose

This was followed by marked diminution in the hemangioma. At the time the child left the hospital this part of the hemangioma had also almost entirely disappeared

I am glad to have had an opportunity of observing this case, as it demonstrates very well the control afforded in these cases of hemangioma by cutting off both the arterial and venous circulation. I am quite sure that experiences of this kind must be rare, and that we would not be warranted in drawing too definite conclusions from the results in this single case

by his name. This consists not in taking small islands of skin, but of splitting the normal skin with a sharp razor, leaving one-half behind and using the other half for the skin grafting. With good technic large strips of skin, 1 inch or 2 inches wide and 3 or 4 inches long can be obtained. In Thiersch's early work these were applied directly to the granulating surface and were kept in contact with the surface by strips of gutta serena tissue or magnesium and over this was applied moist dressings of normal salt solution. I had the opportunity of seeing a good deal of the work done by Thiersch as I was a student in his clinic in Leipzig in the years 1892 and 1893, and Thiersch obtained very admirable results with his method.

There have, however, been some very distinct improvements made since that time. First of all, we have found that the grafts are much more apt to take if we scrape off the granulations from the area before we apply the graft and in the second place, instead of moist dressings which prove efficient in a large percentage of cases to be sure we have found that perfectly dry dressing gives a larger percentage of successes and in the third place, we have found by a good deal of experience, and I have confirmed this in my own work, that grafts taken from other individuals seldom live. I think it would be a fair statement to make that not more than 10 per cent. of the grafts taken from other individuals will heal in and remain permanently. To make the matter still stronger I should say that there is ten times the probability of the grafts taken from the same individual living after their transplantation than grafts taken from other individuals. I do not believe that this very important fact is generally recognized by the profession. A very few months ago I picked up a paper describing a case of skin grafting in which the relatives of the patient or the friends or fellow employees of the patient very generously and heroically contributed a certain amount of their own skin to cover the extensive area which had been destroyed by burn or injury. I must personally confess that for a number of years I was under the impression that grafts taken from other individuals were quite as apt to live as those taken from the patient himself and I was confirmed in this by some rather striking

taken from her mother and father and from some other relatives and friends. The grafts apparently took very nicely and looked at the end of a week or ten days as though they would live and cover the surface. At the end of that time however the grafts melted down and disappeared leaving the surface almost in the same condition as it was before.

Some weeks later the skin-grafting was repeated and with almost identically the same results. For a short time the grafts looked very favorable but later melted down in the same way. The child was brought to our service at the Presbyterian Hospital a few days ago.

In analyzing the facts in the case it is evident that it is extremely important to cover this huge area which is about a foot square with skin-grafts to complete the wound healing and stop the suppuration, which if continued indefinitely would threaten the child's life. The temperature as I have said varies now from 101° to 102° F. She is confined absolutely to bed on her back. She has been, by good nursing and good medical management kept otherwise in very fair condition.

As I analyze the facts in this case from the light of a good many similar cases which we have had in the last few years I believe that there is but one way of handling it that will enable us to cover this enormous surface and get rid of this suppuration, and that is by grafting upon this great surface after we have made it surgically perfectly sterile not the integument taken from other people but skin taken from this child herself. Before we do the operation I want to present this problem pretty fully to you.

You remember in the development of skin grafting Reverdin of Switzerland first suggested skin grafting by the simple method of picking up little pieces of skin with a sharp hook and snipping them off with a pair of sharp scissors and then placing these small skin-grafts on the granulating surface. If they took they became islands of epidermis which gradually grew sometimes each one to the size of a dime or more and if the operation was successful covered eventually the area involved. The Reverdin grafts had a very limited field of usefulness. In the 80's Thiersch devised the scheme of skin-grafting which is known in the literature

tance of this sort of mechanical sterilization—dissecting out of the wound as it is called. Huge irregular shell wounds of the thigh if seen within the period of contamination let us say within six or eight hours handled by dissecting out a thin layer of the entire surface of this wound removing in this way mechanically the germs that have been forced into the tissues permits in a very large percentage of the cases an immediate closure without drainage and secures primary wound healing.

The sterilization of the field upon which we are to place the grafts should be accompanied not only by this mechanical cureting but also by cleansing the integument for a wide area around the granulating surface with tincture of green soap and alcohol.

We have now placed the patient under ether anesthesia and as you see with this very large sharp spoon I am very rapidly cureting off the entire granulating surface including also the edges of the integument around the granulating surface. You will notice that I have my assistant as I remove the large area press flat sponges over the bleeding surface to prevent any large amount of hemorrhage. These sponges are dry and held in there by the flat of the hand and I am asking both of my assistants to rapidly follow me with this sponge pressure as I remove all the granulating tissue. I had this entire field of operation very thoroughly prepared as already suggested with tincture of green soap and alcohol. The oozing here is pretty marked and the amount of blood lost would be very great if it were not for this sponge pressure. It will be necessary for me to get a perfectly dry surface entirely free from blood before we apply the grafts.

At a few points you see I put on artery forceps to control a fair sized vessel that is bleeding freely. It requires as a rule six to eight minutes for the blood to coagulate in the small vessels on this raw surface and as you notice if we should take this time by the watch six or eight minutes seems like a very long period in an operation while we are waiting (Fig. 232 a).

Both thighs of this child have been previously very thoroughly prepared by shaving and cleansing them with tincture of green soap and alcohol. I shall begin now at the upper right hand

examples which I had in my own work. I remember for instance some of the early skin grafting which I did when I was in the United States Marine Service in about 1885—one case in particular where I grafted some skin from a white man and applied it on a leg injury in a negro where I was satisfied that the small islands of integument remained permanently. That particular case I think was simply the exception that proves the rule because in recent years we have had exactly the same experience as the surgeons have had who have previously handled this little patient, and I can now call to mind a number of cases especially children where we have grafted from mother and father and sisters and brothers and have at the end of a week been greatly gratified to see how well the grafts were taking and then found to our dismay at the end of twelve or fourteen days that the grafts had melted down and that we had accomplished little or nothing. I would like therefore particularly to emphasize the importance of removing the grafts from the individual himself. In the light of our present-day knowledge the only possible excuse for employing grafts from some other persons would be where because of the extent of the injury or the bad condition of the patient it was impossible to secure enough skin from the patient himself. In this connection I want to say that as a rule removal of the grafts from the patient is not a very serious matter and that inasmuch as we take but half the thickness of the skin it is seldom a serious injury or menace to the individual and it is so important to use autogenous grafts that the minor injury of removing skin from the patient seldom weighs anything against their employment.

Now in the second place I want to bring out quite fully the importance of sterilizing the field upon which we are going to plant the grafts. This should be done by a very thorough curetting of the entire granulating surface removing all the granulation tissue and with this we remove at the same time enormous numbers of bacteria which are on this granulating surface and mechanically and efficiently sterilize this surface. You know that one of the most interesting new things that has developed during this present war in connection with surgery is the impor

corner of this large area and find that I can uncover about one-fourth of this surface that does not bleed at all. I shall begin now with my skin grafts, taking these two razors that have been specially sharpened this morning for this case. You will notice that one side is ground perfectly flat. My two assistants will help me make tense the integument on the outer side of the thigh. Beginning at the great trochanter I now remove strips of integument about $1\frac{1}{2}$ to 2 inches wide and 3 or 4 inches long. With some ordinary cambric needles fixed in artery forceps my assistant helps me fix the two corners of the graft on the raw surface and, gradually withdrawing the razor, I am able to flatten the graft out perfectly. I want to emphasize the importance of pressing out any air. You will see that under this graft there are a number of air bubbles and with a flat needle I run over the graft as I press the air out from beneath. This is very important, because the air would of course prevent immediate occluding of the graft to the surface. In making the graft you see that I ask my nurse to hand me the razor wet with normal salt solution and you will notice that, in addition to making tension by my assistant, I myself make the graft with a sawing motion and am particularly careful to see the edge of the razor as it splits the skin, so as not to cut too deep and remove at any point the entire thickness of the skin down to the superficial fat.

I am afraid that grafting this enormous area will be rather tedious for you, as it will take probably the greater part of an hour to cover this extensive area. One must not get impatient and one must be very careful after applying the graft not to displace it in the application of the next graft. I am personally thoroughly convinced that the first adhesion of the graft to the raw surface accurately and firmly is of great importance and that grafts that are pushed around and separated from the surface after first being applied are not as apt to take. I cover about

Fig. 232—*a* Extent of area to be grafted. *b* Operation completed. The entire area has been covered by Thiersch grafts, great care being taken to see that each is snugly applied to the underlying raw surface. *c* The grafted area is covered with several layers of gauze which are held in place by adhesive plaster. *d* Application of sterile roller to aid in the protection and fixation of the dressings.



Fig 232

Our conception of the after management is that it is exceedingly important to allow the evaporation of any discharge that may occur under the dressing and that the amount of dressing should be very small and should be of a character to permit of free evaporation. It is important, for instance not to cover the chest of this child with too many bedclothes, permitting of sweating. If there is any evidence of discharge an attempt should be made with an electric fan playing upon this area to dry out the discharge.

Postscript—It was gratifying to watch the after course of this case. The temperature went steadily down from 101° and 102° F, as it had been before the operation, until at the end of the sixth day it remained normal all day long. The child was very comfortable, more comfortable than she had been for months. The thighs distressed her a little for the first few days and then the discomfort disappeared entirely. At the end of the sixth day the dressings were cut off and we could see several inches of the grafted surface which had healed in perfectly. At the end of ten days the entire area was covered in permitting of the removal of almost all the dressings except at a few points where it had become adherent to the narrow scabs that had formed between the skin grafts. The patient went on to a very rapid and very complete recovery.

one-half of this with skin taken from the right thigh and the other half taken from the left thigh so that you see we have removed most of the integument from the anterior and outer aspects of both thighs

Now we have covered every bit of this area (Fig 232 b) The next step is the proper dressing for the grafts I take two thicknesses of dry gauze a little larger than the entire area operated upon and very carefully, without displacing any grafts I flatten this gauze out over the grafts I now take a narrow piece of adhesive plaster and apply it to the upper border of this gauze above the raw area and then one below and two over the center part of the wound (Fig 232 c) You see that this adhesive plaster is separated from the skin grafts by two thicknesses of gauze and that it extends for 3 or 4 inches on either side on normal integument It is perfectly dry Now over this dry dressing I take a large broad soft roller of sterile gauze You see it is about 8 or 10 inches wide I put several turns of this roller over the chest and abdomen bringing it up also over the shoulders like a pair of suspenders (Fig 232 d) Now over this I place a starch bandage about 8 inches wide applying it in the same way as the roller As this dries we have a very firm dressing which is not apt to become displaced We shall dress both thighs from which the grafts have been taken with sterile oxid of zinc ointment a thin layer of which is placed on sterile gauze and the entire surface covered Thin soft roller bandages are placed over these and a spica over the pelvis and then over this again we place some starch bandages which give us perfect security from any displacement of the dressings

As far as the after management is concerned I will say that if there is no evidence of discharge through the dressings we shall leave these dressings undisturbed for a period of ten days At the end of that time they should be removed with the greatest

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SARCOMA OF LOWER JAW

Summary Technic of excision of the lower jaw for malignant disease importance of preliminary ligation of external carotid artery block dissection of lymphatics and submanillary glands

May 6, 1918

THE second case that I want to show you this morning is also a piece of head surgery—a case of sarcoma of the lower jaw on the right side. The process seems to be pretty definitely limited, so that we can make a radical operation with a fair prospect of a permanent cure. I want to dwell particularly upon the technic which we shall employ in removing this lower jaw and the glands of that part of the mouth on the right side.

Under ether anesthesia I shall first ligate the external carotid artery. I make an incision in front of the sternocleidomastoid beginning a little below the thyroid cartilage and going upward to a point about opposite the hyoid bone. As you see, I am joining this with a curved incision under the lower jaw, extending from just below the ear to a point about opposite the middle of the chin (Fig. 233, 1 and 2). This enables me to expose, after we divide the skin and superficial fascia and platysma and deep fascia the sheath of the great vessels. I find that the common carotid divides at the usual point of division about opposite the upper border of the thyroid cartilage. I follow out the external carotid artery and find very shortly after it is given off it gives off a very large superior thyroid artery, which passes downward and inward. I do not care to have this involved in the ligation, so I ligate the external carotid just beyond the superior thyroid which will cut off the blood supply of the area involved in the subsequent steps of the operation. I am very fond of doing this preliminary ligation in these cases and regard it as an important step in the procedure, both because it makes the operation easier and because I believe that it has a tendency to slough out the malignant growth and improve the prospect of at least a long palliation, if it does not add anything definite to the prospect of cure.

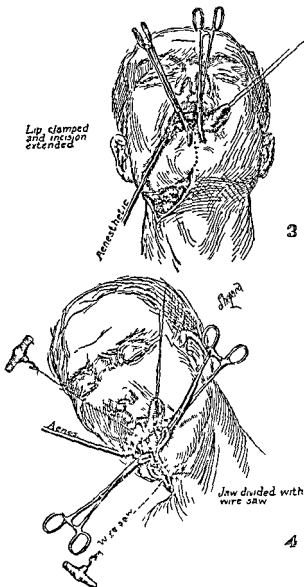


Fig. 234 —3 and 4 The sound tissues have been separated from the jaw, which was then divided in the midline by means of a wire saw and removed

I now extend the anterior part of my incision and split the middle of the lip, clamping the two sides first with artery forceps so as to control any bleeding. I divide the soft tissues from the

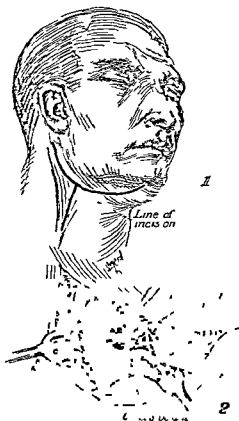


Fig. 233—1 and 2 Incision for ligation of external carotid artery and exposure of tissues to be removed.

jaw well beyond the area of the tumor. With a pair of dental forceps I now extract the right central incisor tooth and divide the symphysis with a wire saw (Fig. 234 3 and 4). I make a free block incision and remove all the lymphatics in the floor of

and then divide the attachments of the pterygoid muscles and general capsular ligaments with strong scissors

You will notice that there is very little if any arterial spurting after the ligation of the external carotid. There is some slight venous hemorrhage, which is easily controlled with artery clamps. The large cavity from which the tumor has been removed is now packed lightly with iodoform gauze and the external incision closed (Fig. 235, 5 and 6)

After-history —The patient made a good operative recovery and experienced a great deal of relief from the pain which he had had before operation. Histologic section showed a mixed cell sarcoma, small round cells and giant cells, giving a fair prognosis. I believe that the use of either radium or x ray will add something to the prospect of cure in this case and would advise that these treatments be carried out.

the mouth and the submaxillary salivary gland with the lower jaw and the tumor Extending my dissection up to the coronoid

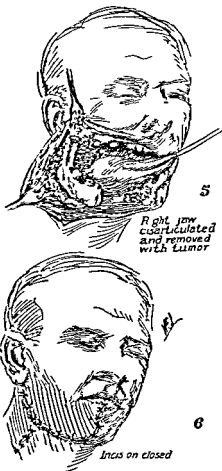


Fig. 235.—5 and 6. Steps in the closure of the wound.

process, I cut off the insertion of the temporal muscle with a heavy pair of scissors Coming to the articulation of the lower jaw, I twist this out, using considerable force so as to dislocate it

CARCINOMA OF THE LARYNX—TECHNIC OF OPERATION UNDER INFILTRATION WITH APOTHESIN

Story A patient who was operated on three months previously for adenocarcinoma of the bowel returns with proved squamous cell carcinoma of the larynx exposure of laryngeal tumor under local anesthesia and removal by cautery after treatment—importance of leaving vent in incision for the escape of mucus and blood and for the introduction of a tracheotomy tube should occasion require two methods of feeding the patient

May 17, 1918

THE case that I shall present to you this morning is one upon which I recently operated About three months ago I resected about 6 inches of the ileum cecum ascending colon and part of the transverse colon in this patient for a carcinoma beginning in the ascending colon several inches above the cecum The operation was done under local anesthesia because of the fact that he had a lesion of the larynx which interfered very greatly with his breathing At that time the exact pathology of the larynx lesion had not been determined by microscopic section and the carcinoma of the bowel was beginning to produce obstructive symptoms which demanded immediate relief He made an unusually rapid and complete recovery from his bowel resection Before leaving the hospital I urged him to have a section removed from the lesion in the larynx so that we could determine its exact pathology and do whatever was necessary at that time He refused to do this but later returned to the city and went to Dr George E Shambaugh who removed a piece of tissue from the larynx by the intralaryngeal route

This was submitted to microscopic analysis and although Dr Shambaugh was inclined from the appearance of the lesion as revealed by the laryngoscope to believe that it was not a carcinoma the histologic examination showed a definite squamous celled carcinoma The lesion is still intrinsic that is limited to the structures inside of the larynx There is no evidence whatever of lymphatic involvement or of any involvement outside of the cartilaginous larynx

I shall operate this morning under local anesthesia and shall use apothecin ($\frac{1}{2}$ per cent solution) with adrenalin (1:100,000)

I have preceded the local anesthetic with $\frac{1}{4}$ grain of morphin and $\frac{1}{16}$ grain of atropin. Placing the patient in a comfortable position so as to bring the larynx well forward and accessible I infiltrate in the median line from the hyoid bone down to the sternum (Fig 236 insert) beginning with a very fine needle such as we use for morphin injections infiltrating a small area with the small syringe and needle and then changing to a larger needle and syringe using about $1\frac{1}{2}$ to 2 ounces of apothemin solution. This makes the area infiltrated perfectly insensitive within a few minutes. I begin at once the incision extending from the hyoid bone down almost to the sternum and divide the skin and superficial fascia and the layer of deep fascia which furnishes the sheath of the sternohyoid and sternothyroid muscles and the thyroid cartilage. Coming down to the thyroid cartilage I expose the soft tissues just above the thyroid for a distance of $\frac{3}{4}$ inch. I expose also the cricothyroid membrane and the cricoid cartilage. I have the anterior sharp edge of the larynx now fully exposed. I try to divide this with a knife but find it ossified and that it is impossible for me to do this. I therefore take a grooved director and beginning at the upper angle run the grooved director behind the cartilage between it and the mucous membrane of the larynx and taking a heavy powerful pair of scissors guiding with the grooved director I run one blade of the scissors down behind the ossified cartilage and divide the entire length with one stroke of the scissors (Fig 236). I then take two sharp retractors and placing them one on either side of the divided cartilage pull the larynx wide apart. The air rushes in as you see as I open the larynx and there is a little irritation from the blood that trickles into the larynx and trachea. I shall take some 1 per cent solution of cocaine on cotton pledgets and cocaineize the mucous membrane of the larynx and trachea so as to prevent any coughing and irritation. At this stage of the operation I have had the head of the table lowered and the foot elevated slightly so that any

Fig 236. Infiltration of the larynx for primary incision. Main figure larynx partially cut. A second figure has been placed submucous to the larynx and trachea. The third figure shows the larynx and trachea after the blood of the vessels has been removed.

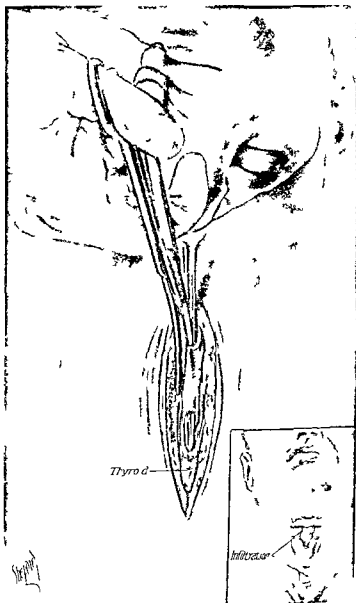


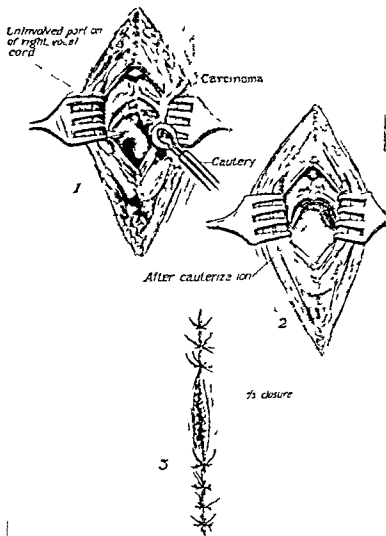
Fig 20

blood that may get into the larynx and trachea will run down into the mouth and not into the trachea and bronchi

Spreading the larynx open widely I can now see the lesion which is a flat epithelioma of the left vocal cord extending for a short distance into the right cord. The lesion is quite limited and it is evident that we can remove thoroughly the entire malignant process without sacrificing the larynx. I shall do this with the electric cautery using a small electric hand light which illuminates the interior of the larynx very nicely (Fig 237 1). I destroy all of the left vocal cord and the entire lesion and about one half of the right vocal cord. I do this rather slowly using a cautery heated to a brown color and not to a bright red color. It is very important to do this because a very hot cautery will destroy the tissues so rapidly as to produce hemorrhage while a cautery heated to a brown heat will cook the tissues and if properly used destroy the lesion quite as effectively without producing any bleeding (Fig 237 2).

The patient has stood the operation remarkably well and has shown little evidence of distress or anxiety. How shall we handle the operative wound? Shall we make an immediate closure and trust to his ability to breathe through the normal passage or shall we use a tracheotomy tube? I think that neither plan is desirable. I shall simply close this 4-inch incision in part and leave open that part of the skin incision which is directly opposite the divided thyroid cartilage and cricothyroid membrane (Fig 237 3). This will make it easily possible for us to introduce a tracheotomy tube if one is required in the further management of the case. It will give an additional advantage of expelling a good deal of mucus and some blood directly through this opening. We have found by previous experience that this is the preferable plan of procedure. We shall allow the patient to sit up on a back rest. I shall protect the wound with two or three

Fig 237—1 Larynx opened exposing tumor for removal with electric cautery 2 Removal of tumor completed 3 Skin incision left open opposite incision in larynx to serve as a path for drainage and to facilitate the emergency introduction of a tracheotomy tube



CLINIC OF DR. CARL BECK

NORTH CHICAGO HOSPITAL

PARTIAL RHINOPLASTY—TRANSPLANTATION OF SKIN FOR REPAIR OF DEFECT ON TIP OF NOSE BY THE ITALIAN METHOD

THE restoration of a part of the nose for cosmetic purposes is sometimes difficult. A great deal depends on the healing process.



Fig. 238



Fig. 239

Fig. 238.—The wide scar contracted and exposing the cartilage. One notices that in the upper part of the scar the healthy skin passes in a sort of step into the exposed cartilage which is covered by scar. The left nostril wide and the right nostril narrow; most of the contraction in the corner of the left nostril.

Fig. 239. Side view of the patient before the operation. Shows the abruptly descending scar of the nose cutting off the tip.

layers of gauze, which will be changed frequently by the nurse as they become saturated with mucus and wound secretion.

The after management of these cases is particularly important and I shall give you the details which we have found to be of value. First, the patient should be given normal salt by rectum, about 8 or 10 ounces every three or four hours for the first twenty four or forty-eight hours. It will be difficult for him to swallow. The morning after the operation, if the patient cannot swallow, one of two plans may be adopted. The patient may roll over on his right side in bed with his head hanging over the bed a little lower than his body, and in this position it will be found possible, as a rule, for him to swallow water, milk and broth. If, however, it is difficult for the patient to do this, a No. 12 or 14 catheter is carefully introduced into the mouth and into the esophagus and down the esophagus for a distance of 8 or 10 inches, and fluids, milk, water, gruels, and cocoa are administered in this way until he regains control of the epiglottis. The few stitches that we have employed in the upper third and lower third of the wound should be removed early, on the third or fourth day, to prevent cutting of the tissues. At the end of about eight or ten days, when the wound looks normal and is covered with healthy granulations, if the patient breathes perfectly well through the normal passages the small open central portion of the wound should be closed by adhesive strips, or at least brought together so as to make wound healing by secondary intention the more rapid.

Postscript—This patient made a very satisfactory, uninterrupted recovery. The stitches were removed at the end of the fourth day. He developed no evidence of any lung complications. It was difficult for him to swallow except in the hanging head position. This way he managed fairly well.

This patient's case interests us because he has developed two primary carcinomas at different points of the body, one an adenocarcinoma of the bowel and the other an epithelioma of the larynx evidently quite independent of each other. Of course, it is also interesting from the fact that both of these conditions have been operated upon under local anesthesia with very great satisfaction both to the surgeon and to the patient.

whether this tip should be restored from the neighborhood by a pedicled flap transplantation or from a distance by the Italian method. The face of a woman in plastic operations should be disfigured as little as possible. In a man especially one who grows a beard it is easier to avoid a scar, the skin does not show the scar so badly. A flap operation from the forehead would have left considerable scar on the same. The same scar



Fig. 241.—Patient's arm is connected with the face and held in a position by a plaster cast which is made so that it allows absolutely the freedom of the nose to the mouth. There is no dressing in the wound of the nose. One can see the flap firmly attached to the defect. There is some padding between the cheek and the arm and some cover over the left eye because the perspiration and the blood discharge liable to cause eczema if not protected.

formation would be visible in the transplantation from the cheek. With the best possible results we could not have avoided scars on the cheek with perhaps some deformity. It was deemed best therefore to employ the Italian method of transplantation using a flap from the forearm under general anesthesia, in a typical manner a flap of skin was cut from the inner surface of the left forearm the nasal defect was freshened on by exact dissection

The following case is illustrative of the good results in a case of restoration of the tip of the nose.

This young woman, twenty-one years of age, had the misfortune of having her nose bitten off by her husband in a fit of jealousy. The teeth cut into the anterior portion of the nose so that the projecting tip was torn off and the cartilage was badly



FIG. 240.—Patient during operation. The scar is re-ected from the nose by sharp incisions and one sees now the defect produced by this preliminary step. One can see the broad border of the skin of the nose distinctly.

lacerated. The nose retained its shape to a certain degree but only in its cartilaginous portion. After healing by suppuration there remained a very unsightly scar because it presented the cartilage covered by a shining white surface (Figs. 238 and 239).

The patient urgently wished restoration. Her cheeks and the rest of her nose were in excellent condition, free from every scar and of very fair skin. The decision had to be made

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of the scar, making sharp and clean borders where the teeth of the miscreant had produced regular indentations. A defect of a more or less rectangular shape was the result (Fig 240). This sharp border was united exactly with as few sutures as possible to the flap of the forearm on three sides and for ten days the arm was left in apposition, so that the flap of the arm could heal into the nasal defect (Fig 241). After ten days the flap from the forearm was separated in its pedicle on the fourth side (Fig 242).



Fig 242—The flap from the arm has been separated and left in contact with the nose the fourth side of the flap which has not been detached is seen projecting. The defect of the arm produced by the flap is sutured, so as to leave as little scar as possible.

It had healed on beautifully to the nose (Figs 243 and 244), and now it was shaped and united to the fourth side of the defect, which corresponds to the left side of the tip of the nose (Fig 245). Unfortunately, all this cannot be done in one sitting. It takes a few days always to reduce the size of the swollen pedicle, inasmuch as the tissues change in size and color as the healing takes place.

One has to know a great deal about these changes in order not to make the mistake of making such a flap too large or too small. During the process of wound healing the borders of the skin are somewhat swollen and irregular, after a few weeks scars thin out, become paler and often retract, thus creating grooves



Fig. 243

Fig. 243—Front view of the flap which has been inserted and is still not adapted in its fourth side. One stitch holds it yet at the place where it is liable to separate but alongside the right incision and on the septum it has healed in beautifully.



Fig. 244

Fig. 244—Side view of the nose in this state shows the thickness of the flap, with the underlying submucous tissue which is allowed to shrivel up for a few days before it is ultimately united into the fourth side of the defect namely the left side. This is necessary so as to get the utmost shrinkage of the flap before adapting it.

where projections were before. All this has a great bearing upon the ultimate plastic result.

At the end of about three weeks the flap has now firmly united, joined on all sides and forms a nice tip of the nose of the same color and appearance as the rest of the skin. This, however, does not finish the whole plastic for cosmetic purposes. Small

corrective operations have to be done in order to make the nasal trans-plant fit in shape and color exactly and excision of small portions of scars leveling of protuberances has to be done until finally an ideal result is obtained (Fig 246)

These conditions however are a matter of weeks. The elimination of scars in particular is one process which in these



Fig 245



Fig 246

Fig 245—The result of the plastic immediately after adaptation of the fourth side to the defect. It is one of the most difficult problems to make the adaptation exact and so that it should leave very few scars.

Fig 246—The result of the plastic eight weeks after the operation. There is some visibility of scar but in the course of six to eight weeks this slight visibility will disappear entirely. The right side already shows very little difference between trans-plant and original skin.

very delicate cosmetic operations is of great importance and requires a very fine delicate technic. Inasmuch as many individuals have a tendency to develop scars of much larger size than others one has to know how to deal with these excision of scar tissue to prevent the formation of keloid or exuberant scars.

TREATMENT OF PHLEGMON OF HANDS AND FINGERS

- 5 *ary* Two cases illustrating the supreme importance of wide incision with perfect exposure of infected tissue in the management of hand infections

THERE is still a wide difference of opinion among surgeons as to what is the best treatment of phlegmonous infection of fingers and hand. I am going to illustrate a treatment which I consider most appropriate on two typical cases. The first is that of a phlegmon of the thumb in a lady forty five years of age who stuck her thumb with a darning needle and infected it. There was only a point like entrance wound at the time of the injury but very soon there developed typical symptoms of infection of a punctured wound namely swelling a great deal of tenderness heat edema of the thumb extending into the palm of the hand. The physician who was called in the first place made under local anesthesia (which probably was not a full anesthesia as the patient complained of a great deal of pain during the operation) a deep but very small incision in the neighborhood of the first joint with the result that some pus escaped but not much relief was given to the patient. On the contrary a few days after this incision the patient who had a small goiter rapidly developed exophthalmus palpitation of the heart and considerable increase in the size of the thyroid gland.

When I first saw her she had a typical swelling of a phlegmonous thumb the edema was not very extensive over her palmar surface but the symptoms of exophthalmic goiter quite pronounced patient extremely nervous with rapid heart beat constant perspiration and diarrhea were added to the symptoms of infection consisting of fever and local changes in the thumb.

An anesthetic was necessary but it was a morphin scopolamin injection with very little ether and the whole thumb in its volar surface was split over both phalanges. It was found that the tendon was necrotic at the bottom and the fatty subcutaneous cell tissue of the thumb was partly replaced by the yellow necrotic

tissue of the phlegmonous infection. Everything was cleaned away which seemed pathologic the wound left in clean condition, packed and dressed (Fig. 247).

Immediately fever and local symptoms disappeared. Within a week the symptoms of exophthalmic goiter almost subsided the goiter grew smaller the pulse became normal the patient left again.

The after treatment consisted in a local bath for about two weeks until the wound had become absolutely clean and filled



Fig. 247 Thumb split from the nail down to the second phalanx.

with redundant red granulations (Fig. 248) whereupon secondary suture was applied and the borders of the wound adapted again. It healed by secondary union rapidly (Fig. 249).

Within four weeks the patient had no symptoms of exophthalmic goiter and an almost normal thumb.

The second case is one in which the patient injured his index finger with a screwdriver and cut it deeply. He developed im-

When he came to me he already had two incisions in his finger, under local anesthesia small and deep, both had yielded some pus. Out of these incisions were protruding unhealthy granulations edematous and red, very sensitive, and pus escaping. In the dorsal region there seemed to be some deep indistinct fluctuation. The patient had a temperature



Fig. 248. The granulation protruding, and the two divisions of the thumb gradually closing upon the other by granulations.

The first thing we did was the application of moist dressings to his arm with Billroth's solution. This very soon reduced the inflammatory condition of lymphangitis and adenitis. Whereupon under general anesthesia his hand was opened by an incision extending from the tip of his right index finger on the inside of the hand clear down to the median line of the wrist

(Fig 250) In this incision the sheaths of both tendons of the index finger were found surrounded and filled with thick yellow pus. The pocket extended into the dorsal surface. Nothing else was done but this cavity packed and the patient brought to bed after his operation. The dressings were changed on the fourth day. Unfortunately, the tendons were dead and sloughed out very shortly leaving healthy granulations extending through the whole incision but some fibers of the paratendinous tissue remained alive.

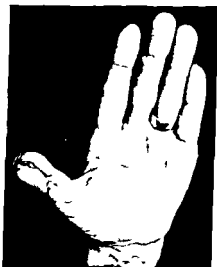


FIG. 249. The end result with secondary union produced by adhesive plaster adaptation.

Within three weeks after the injury the last traces of the dead tendons sloughed off and the hand was treated during this whole time by simply removing the packing and dressing over the wound. As soon as the granulations were perfectly clean with no more foreign body or necrotic tendon present a secondary suture united the wound and restored the shape of the hand (Fig 251).

Even at this time flexion of the finger within the joint of the third phalanx and metacarpus is possible evidently due to the remnants of some fibers of the flexor tendon.

But the question will arise whether it is worth while to undertake a plastic of the flexor tendon so as to allow full folding of the index finger. It seems to me that that will not be possible although it may be tried.



FIG. 280. Incision of the phlegmonous hand into the middle of the hollow of the hand. Show also the necrotic tendon in the center (the tendon is white) at the time of the first operation.

These two cases illustrate how phlegmonous affections of fingers and hands ought to be treated, namely, wide opening of the infected area along side anatomic channels, giving a chance to all infected areas to discharge their dead and half dead tissue outward without much tension, and then to restore by secondary suture normal contours of the hand. Undertake no plastic work until the hand has become perfectly normal, perhaps a year or two years after this severe pathological condition has healed out.

Until then plastic operation will not be successful, but when



Fig. 251—Method of adaptation after all the septic infectious process has yielded to granulation. The ultimate result is perfect healing with possibly some stiffness in the movement of the index finger which gradually however allows some flexion.

normal conditions have returned tendoplasty may be tried with some prospect of success.

CLINIC OF DR DANIEL N EISENDRATH

COOK COUNTY HOSPITAL

THE ACUTE ABDOMEN—A CLINICAL LECTURE

Summary A patient presenting symptoms of an acute abdominal condition complicated by certain evidences of intrathoracic disease—differentiation of the acute abdomen from acute inflammations of the pleura Detailed analysis of the signs and symptoms of acute abdominal affection

THIS patient presents many of the symptoms of an acute abdominal condition but the question has been raised whether we are not dealing with some acute thoracic lesion whose clinical picture simulates very closely that of an acute affection of one of the abdominal viscera In other words, has this patient a pneumonia with referred abdominal rigidity and tenderness or has he one of the numerous conditions which can give rise to the so-called "acute abdomen"?

What are the salient facts in his history? A man sixty seven years of age, a tailor by occupation has always enjoyed good health up to two weeks ago, when his present illness began with a cough and pain in the right side of the abdomen The cough has been accompanied by the expectoration of a large amount of yellowish mucopurulent sputum He has never had any attacks of abdominal pain up to two weeks ago His previous history, habits etc, only reveal the existence of a chancre twenty years ago The physical examination of his lungs and heart fails to show any changes which would account for the abdominal symptoms Let me, however, call your attention to the great value of the examination of acute pulmonary lesions with the fluoroscope and by taking stereoscopic pictures of the chest During the past winter it has been possible to diagnose areas of consolidation by these x ray methods at many of the cantonment base hospitals before the physical signs showed a pneumonia or emphysema

I feel confident even without an x ray examination that we can exclude a thoracic condition as the underlying cause of his acute abdominal symptoms even though his breathing is rapid and costal in type. One must however never overlook the possibility that a pneumonia or a pleurisy situated close to the diaphragm may give rise to such marked abdominal rigidity and tenderness as to completely simulate a true intra-peritoneal lesion, and many patients have been laparotomized for a supposed acute appendicitis or acute gall bladder infection when, in reality the cause was located above the diaphragm.

The patient since his entrance to the hospital has appeared very ill, but his temperature remains about 101° F and the highest white blood-count is 15 000 with 80 per cent. polymorphonuclears. The chief symptoms during the two weeks since the onset of his illness have been the cough and the right-sided abdominal pain. Let us now examine the abdomen. This reveals the following:

There is a soft irreducible umbilical hernia about the size of a walnut. The lower half of the abdomen is quite prominent and moves but little with respiration. There is no rigidity present anywhere except in the right upper quadrant, but there is tenderness over the entire right half, rendering it impossible to palpate satisfactorily. No areas of dullness can be found. Rectal examination does not reveal any bulging as is often found when an appendiceal abscess lies in the true pelvis. In this connection let me urge you never to omit taking the rectal temperature in every acute abdominal case, and again, never to fail to make a rectal examination in both sexes especially children, and a bimanual vaginal examination whenever possible in the female.

Let us consider some of the many acute abdominal conditions which can give rise to symptoms such as this patient has and see if we can arrive at a diagnosis by excluding the majority of them from further consideration.

In the differential diagnosis of the various conditions which appear under the clinical picture of the acute abdomen it is of advantage to have some definite plan of enumerating them so that even the less frequent ones are not omitted from consideration. I have found that if I begin with the viscera normally found in

the upper abdomen and think of the acute lesions of these structures and then proceed to recall those of the viscera of the lower portion of the abdomen. I can rapidly eliminate one condition after the other from consideration. The same is true of extra-abdominal causes which can also be enumerated from a regional standpoint, *e g*, nervous system, thorax, etc.

The conditions which the surgeon must consider in making the diagnosis of the cause of the acute abdominal symptoms in his patient are the following enumerated, as I have just suggested, according to viscera and regions.

Acute abdominal affections

- 1 Biliary passages, liver, and subphrenic space
 - (a) Infections of the gall bladder or bile-ducts, with or without calculi
 - (b) Abscess of the liver (solitary or multiple)
 - (c) Subphrenic peritonitis (dry or suppurative)
- 2 Stomach and duodenum
 - (a) Acute and subacute perforations of ulcers
 - (b) Acute dilatation of the stomach
- 3 Pancreas (acute and subacute hemorrhagic and suppurative pancreatitis)
- 4 Spleen
 - (a) Acute perisplenitis
 - (b) Splenic abscess
 - (c) Torsion of movable spleen
- 5 Omentum and mesentery (including vessels)
 - (a) Torsion of the omentum
 - (b) Acute suppurative epiploitis
 - (c) Thrombosis and embolism of the mesenteric vessels
 - (d) Acute suppuration of the mesenteric lymph nodes
- 6 Small intestine
 - (a) Acute Meckel's diverticulitis
 - (b) Ileus of various forms (especially obstruction by bands, links, through apertures, or by intussusception)
 - (c) Gastro-enteritis
 - (d) Lead-colic.
 - (e) Reflex ileus from various causes

- 7 *Large intestine (except cecum and appendix)*
 - (a) Sigmoid diverticulitis
 - (b) Various forms of ileus (especially volvulus)
 - (c) Inflamed rectal diverticulum.
 - (d) Enterocolitis
- 8 *Cecum and appendix*
 - (a) Primary typhlitis (non malignant)
 - (b) Appendicitis (pyogenic actinomycotic, and tuberculous)
 - (c) Carcinoma of appendix or cecum with secondary infection.
 - (d) Acute infection of ileocecal lymph nodes
- 9 *Peritoneum*
 - (a) Acute pyogenic peritonitis due to non traumatic perforation of a hollow viscus or extension from internal genitalia of female.
 - (b) Pneumococcus peritonitis
 - (c) Subacute tuberculous peritonitis usually secondary to tuberculous appendicitis
- 10 *Genito-urinary tract.*
 - (a) Acute infections of kidney perinephritic tissue and ureter
 - (b) Renal and ureteral calculi.
 - (c) Dittl's crises (kinking of ureter in movable kidney)
 - (d) Strictures of the ureter with infection
 - (e) Tumors of the kidney (with fever)
 - (f) *Acute inflammation of the intra abdominal portion of the vas deferens*
- 11 *Internal genitalia of female*
 - (a) Twisting of pedicle of ovarian cyst or pedunculated fibroid of uterus
 - (b) Salpingitis oophoritis etc.
 - (c) Extra uterine pregnancy

Extra-abdominal causes

- 1 *Thorax (pneumonia and pleurisy—especially diaphragmatic—with referred abdominal symptoms)*

2 Nervous system

- (a) Tumors of spinal cord or spinal column with referred pains
- (b) Tabes with visceral crises especially gastric and renal
- (c) Hysteria

3 Inflamed lymph nodes along the iliac vessels (simulates acute appendicitis)

It will be impossible for us to discuss in detail all of these many affections which must be taken into consideration in the differential diagnosis of the acute abdomen but we will take up briefly the more common ones

1 Biliary passages liver and subphrenic space

Under acute affections of the biliary passages we include the following

- a Acute cholecystitis with or without calculi in the gall bladder or cystic duct or both
- b Acute choledochitis (acute inflammation in the common duct or main hepatic ducts) with or without calculi
- c Acute cholangitis (intrahepatic)

a Acute cholecystitis with or without calculi in the gall-bladder or cystic duct or both

It was formerly thought that the mere passage of calculi could be the only cause of severe pain referable to the biliary tract but we now know that the passage of such calculi is invariably accompanied by more or less inflammatory reaction or is rather caused by this and furthermore it is a well recognized fact that an acute or chronic infection within the lumen of the gall bladder or of the extrahepatic or even of the finer intrahepatic bile-ducts can give rise to practically the same clinical picture as though calculi were present. It is therefore advisable both in regard to diagnosis and prognosis to be guarded in making the statement that calculi are or are not the cause of the acute symptoms in these structures. In other words the clinical picture of a severe infection of the gall bladder without calculi does not differ in any essential particular from that of a similar case in which a single large or a number of small calculi are present. The most striking symptom is severe pain referred to a point corresponding

to the outer portion of the right rectus muscle close to the right costal arch. The typical radiation of pain (Fig 252) is toward the right shoulder, but in a number of cases it has been observed to radiate to the left shoulder as well, and often one sees a patient whose principal direction of radiation of pain has been directly backward toward the spine. This pain is usually accompanied

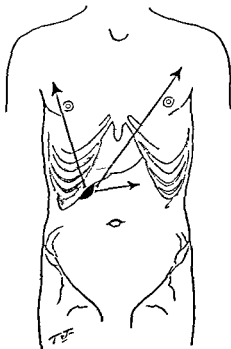


Fig 252—Arrows indicate various directions in which pain radiates in acute cholecystitis with or without calculi.

by rise of temperature to 103° F or higher, by a marked leukocytosis, vomiting during the attack, and a slight rise in the pulse-rate. On palpation there is usually tenderness present just below the right costal arch along the outer border of the right rectus muscle. If the patient is seen just after an attack one can best elicit this tenderness by hooking the fingers deeply from above

beneath the costal arch while the patient is asked to take a deep breath. In some cases a distinct ovoid, elastic swelling is to be felt over the area of tenderness due to the tensely filled gall bladder, but one can be readily deceived by mistaking for it the rigidity which is usually present in these cases in the right upper quadrant of the abdomen. If the liver is located at a

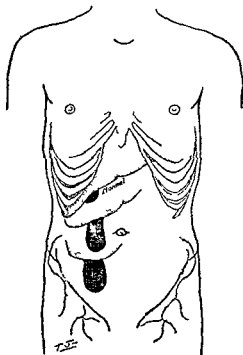


Fig. 253 —Location of gall bladder when liver is in its normal position and in different degrees of ptosis of the liver (A and B)

lower level than normal or if there is a so-called long, pendulous gall bladder all of the local findings just described may be most marked at the level of the umbilicus or even lower, as far down as the level of Poupart's ligament (Fig. 253)

Icterus is not a symptom of acute cholecystitis with or without calculi. It may be present in slight degree during the attack,

but disappears rapidly as soon as the inflammatory symptoms subside, and even if present is never of as deep a tint as is the case in infection with or without calculi in the common duct

b Acute cholelithiasis, with or without calculi

Calculi within the common duct give rise to more or less typical symptoms in about 80 per cent of the cases. These are

(a) *Jaundice*—If the calculus is firmly impacted at any portion of the duct the jaundice is intense sudden in onset and permanent until the calculus is either passed spontaneously or removed at operation or until the inflammatory swelling of the head of the pancreas subsides sufficiently to allow bile to pass alongside of the calculus into the duodenum. I mention the head of the pancreas because it is at this lower end of the common duct—i.e., just above or at the ampulla of Vater—where an obstruction of the common duct is most frequent as a result of the impaction of calculi. Acholic stools (clay colored) accompany the jaundice.

(b) *Chills and Fever*—They are a very frequent accompaniment of infection of both the extra and intrahepatic bile-passages. The chills and fever recur at irregular intervals followed by a profuse perspiration and differ from malarial chills both by the irregularity of their recurrence and the absence of the plasmodium in the blood. I mention this particularly because many such cases have been mistaken in the past, and are still wrongly diagnosed as malaria especially when pain and jaundice are not prominent in the clinical picture.

(c) *Pain* is not as prominent a symptom of infection (with or without calculi) in the common duct as it is with the same condition in the gall bladder or cystic duct. The pain is usually located near the median line but has the same directions of radiation as is true of gall bladder diseases (see Fig. 252).

Atypical common duct cases

In about 20 per cent of the cases calculi may be present in the common or hepatic or even in the intrahepatic bile-ducts without giving rise to any symptoms whatsoever. I have already called attention to these so-called silent common duct calculi¹ and

¹ *Medicine and Surgery* July 1917

emphasized the importance of a thorough examination of the common duct during operations for cholelithiasis when certain indications are present

The syndrome which has been usually thought to be pathognomonic for calculi in the common or hepatic ducts is jaundice pain acholic stools chills and fever Our views however have

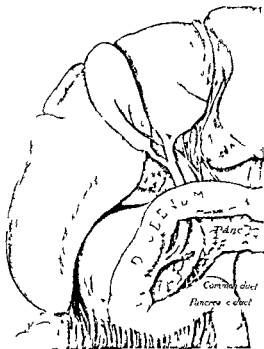


Fig. 254 Topographic relations of common and pancreatic ducts to duodenum and pancreas after Zuckerkindl

changed in this respect that we know that an infection (without calculi) within both the extra- and intrahepatic bile ducts can give rise to practically the same symptoms including jaundice as when calculi are present. It is only necessary to remember (Fig. 254) the close relation of the lower end of the common duct to the pancreas. In nearly 90 per cent of the cadavers examined

by Von Bungner the common duct was found to be completely surrounded by the pancreas and one can readily understand how either an acute or chronic pancreatitis can cause obstruction to the common duct like that due to a calculus and favor the spread of infection within it

c Intrahepatic infection cholangitis with or without calculi

The symptoms of infection within the liver itself if still confined to the bile-ducts and to the immediately adjacent tissue do not differ enough from those mentioned in the previous class—the common duct cases—and cannot be differentiated from them

Before leaving this subject of acute infections of the biliary tract it is well to recall to your mind the fact that cases of carcinoma of the gall bladder may on account of the acute infection accompanying them simulate to such an extent an acute cholecystitis as not to be recognizable until the malignant condition is disclosed at operation. Again it is important to remember that certain complications of gall bladder infections may change the clinical picture considerably. I refer especially to cases of pericholecystic abscess due to perforation of the gall bladder wall and to those of formation of an abscess between the gall bladder and the abdominal wall or between the gall bladder and one of the adjacent viscera or finally in the right subphrenic space. If the latter condition occurs the symptoms due to it completely change the clinical picture and the underlying condition of gall bladder infection is completely overshadowed by the symptoms of subphrenic abscess.

Perforation of the gall bladder into the general peritoneal cavity does not as a rule give rise to the same severe initial symptoms as will be mentioned under the head of perforated gastric or duodenal ulcer. There is usually a history of preceding gall stone attacks but aside from this one cannot distinguish the symptoms of peritonitis due to such a perforation in the majority of cases from those due to perforation of other upper abdominal viscera.

Abscess of liver

Solitary Abscess—This must be thought of whenever a patient complains of pain in the right upper quadrant of the abdomen

radiating to the right shoulder and accompanied by irregularly recurring chills, fever, and sweats. It is most common in tropical countries as a complication of amebic dysentery, but the latter occurs often enough in our northern climate to think of a solitary abscess when the symptoms I have just enumerated are present, and a search should be made for the *Amœba coli* in the stools. If the abscess is situated close to the convexity or lateral aspects of the liver, an area of dullness may be found extending upward from the liver and an absence of the normal respiratory excursion in the costophrenic sinus. I have called attention¹ to the great value of the x ray in making an early diagnosis of abscess of the liver situated near the diaphragm as well as of subphrenic abscess, and can warmly recommend both the fluoroscopic and stereoscopic plate methods from day to day whenever these are available. Icterus is not a typical symptom of a solitary abscess, but is more frequently present in multiple abscesses. It is necessary to differentiate such a solitary abscess when fever is present, especially when accompanied by irregular chills and sweats, from multiple abscesses of the liver (see below), from a subphrenic abscess (see below) from infection within the kidney (pyelonephritis), and also from an encapsulated empyema between the lower lobe of the lung and diaphragm. Exploratory puncture should only be performed whenever an x ray examination is not possible, and then only just before an operation, because one is very apt to infect the abdominal or thoracic wall if a long interval exists between the time of puncture and that of operation.

Multiple Abscesses of the Liver—These are almost invariably secondary to one of two conditions. (a) Infection somewhere along the course of the portal vein—most frequently the appendix (Fig. 255), (b) as a complication of calculi in the intra- or extra-hepatic bile-ducts or even as an extension of a severe infection (acute cholecystitis) from the common duct into the finer bile-ducts within the liver. I have already described² the first condition as a complication of appendicitis in a previous lecture, and have described the second cause of multiple abscesses under

¹ *Surgical Clinics of Chicago*, 1917, vol. 1, p. 1035

² *Ibid*

the head of acute infections of the gall bladder and bile-passages (see above) today.

The septic condition of the patient overshadows the local symptoms to such an extent that when the severe chill fever, and sweat cycles recur at irregular intervals, one does not think of

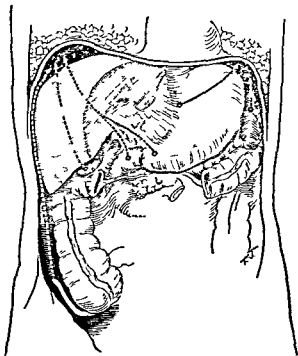


Fig. 230.—Most frequent primary foci of infection in subphrenic abscess. On the right side the arrows indicate how infection reaches the subphrenic space from the appendix, gall-bladder pyloric region, and duodenum. On the left side the arrows show routes of infection from lesser curvature of stomach and from spleen.

an intrahepatic infection. I have known such a dread complication to occur both in cases of severe appendicitis with a generalized peritonitis and in much milder forms of appendicitis where the appendix was gangrenous but the prognosis for an uneventful recovery seemed beyond doubt until the symptoms of sepsis

with irregularly recurring fever chills and sweats appeared as indicating an extension of a suppurative thrombotic process from the veins of the appendix to those within the liver

The previous history of an appendicitis or of infection within the biliary tract will be of the greatest aid in differentiating this acute condition from that of a severe infection within the kidney especially when there are but localizing signs referable to the latter organ A diagnosis of malaria covers a multitude of errors of omission in cases presenting chills fever and sweats as the most prominent symptoms and should never be made unless the *Plasmodium malarie* is demonstrable

Subphrenic Abscess—In the lecture on complications of appendicitis¹ I have referred to the occurrence of this acute condition It may also follow infection or perforation of the gall bladder perforation of a gastric or duodenal ulcer or an infection of the kidney or spleen

One must always think of this condition when fever and other evidences of infection persist after one of these various primary affections has been operated upon or exists If the primary cause is in the gall bladder right kidney duodenum pyloric end of stomach or appendix the abscess is to be found somewhere beneath the right half of the diaphragm If the underlying disease is in the posterior wall or lesser curvature of the stomach spleen or right kidney the secondary abscess is in the left subphrenic space (Fig. 255)

Comparatively few of the cases present any local signs such as pain tenderness rigidity etc hence the diagnosis in the majority of cases must be one of exclusion as to the cause of the symptoms of infection when it occurs either as an apparently primary acute abdominal affection or when it is secondary to an operation for one of the lesions just mentioned

The fever is of a continuous type chills not being present unless the abscess is the result of the extension to the subphrenic space of an intrahepatic infection In such cases the symptoms of the latter condition completely overshadow those of the subphrenic abscess and a differential diagnosis is only possible before

operation by an x ray examination. Exploratory puncture should never be done unless one is prepared to operate immediately afterward.

In the majority of cases of subphrenic abscess the diagnosis can be made from the following data:

(a) Fever and other evidences of infection as a complication of one of the primary conditions enumerated above.

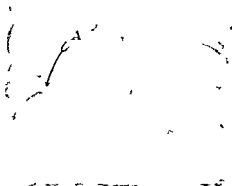


Fig 256—Typical convex shadow seen in the x ray plate of case of subphrenic abscess. Arrow A points to the upward bulging shadow seen at right dome of diaphragm.

(b) x Ray examination shows irregularity in outline and movement of diaphragm (Fig 256).

(c) Evidences of dulness (irregular in outline) along upper border with more or less displacement of liver downward on right side and of circumscribed areas of dulness close to diaphragm on left side.

(d) Exploratory puncture reveals pus.

2. *Stomach and duodenum*

(a) Perforation of benign or of malignant lesions.

I was under the impression that only the perforation of an ulcer of the stomach or of the duodenum could give rise to acute symptoms until recently, when a case in which perforation of a carcinoma of the posterior wall¹ caused me to change my opinion. The view held by many clinicians that a perforation of a benign ulcer of the stomach or duodenum always gives rise to acute symptoms must also be revised.

Moynihan and Lund were the first to direct attention to a group of cases of subacute perforation in which the symptoms are very indistinct, and the first suspicion of a perforation is when the local signs of encapsulated suppuration are found before and confirmed at operation as having had their source in the perforation of a gastric or duodenal ulcer, the location of the abscess, of course, varying with that of the ulcer and being found either in the general or lesser peritoneal cavity.

The more acute perforations take place into the general peritoneal cavity with no tendency toward walling off of the spreading infection. In the first hours the differential diagnosis must be principally made from that of an acute pancreatitis (see below) on account of the proximity of the viscera. The most important data upon which to base a diagnosis of perforated gastric or duodenal ulcer are the following:

(a) Pain—sudden, paroxysmal, and severe—referred at first to epigastrium in both gastric and duodenal ulcers, but also to right side of abdomen in duodenal ulcer (especially to right iliac region).

(b) Muscular rigidity and tenderness in same areas as pain or tenderness. In the case of a duodenal perforation cases have been erroneously diagnosed as appendicitis in the early stages because of the prominence of the right sided symptoms.

(c) Collapse—not so severe as in acute pancreatitis, and appears slower.

(d) History of gastric or duodenal ulcer. At times patient has been under medical treatment for one of these conditions.

The above symptoms are only present in the first six to twelve hours. After this period the symptoms are those of a spreading

¹ Described in Surg. cal Clinics of Chicago, February, 1917.

peritonitis. The most valuable evidences of such a wider dissemination of the infection are the increase from hour to hour of the extent of the muscular rigidity (Fig 257) and tenderness accompanied by a corresponding steady rise in the pulse-rate. Vomiting, obstipation, and abdominal distention are symptoms of a more advanced peritonitis. They do not appear until long

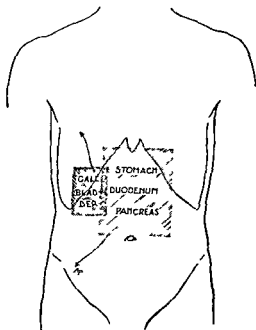


Fig 257—Typical locations of areas of rigidity and tenderness *a* In perforation of gastric or duodenal ulcers and in acute pancreatitis *b* in acute affections of biliary tract.

after the diagnosis should have been made to be of avail if the patient is to be operated upon.

Acute Dilatation of the Stomach—This usually occurs as a complication of operations in the upper abdomen, appendix, and for peritonitis from any cause. It may however, be found—as an acute condition independent of these causes, *e g*, in pneu

monia, gastritis, and many other conditions, and should be recognized and gastric lavage done to save a life. It is seen clinically in one of two forms

(a) Symptoms of upward displacement of the diaphragm (cyanosis, dyspnea, shock, rapid pulse), with marked prominence of epigastrium and tympanic note extending well up into thorax

(b) Same symptoms as above, accompanied by vomiting without much effort of large quantities of brownish, sour fluid

The condition is usually due to a paresis of the gastric musculature and requires immediate recognition¹ and treatment

3 *Acute affections of the pancreas*

In a recent case I was able to make a diagnosis of acute pancreatitis before operation from the following data. Two days before admission to the hospital the patient, a woman of fifty, had been taken suddenly with a most intense and constant pain localized just between the ensiform and umbilicus, in the median line. The pain continued for the greater portion of the first twenty-four hours and shortly after its onset was accompanied by vomiting. Upon admission to the hospital the case was at first thought to be a spreading peritonitis due to perforation of one of the hollow viscera of the upper abdomen (stomach, duodenum, or gall bladder). I was, however, struck by the collapsed appearance of the patient. Her eyes were sunken, nose pinched and cold, lips and finger nails bluish, skin cold and clammy, and pulse very small and soft. The abdomen although uniformly distended was not rigid or tender. Laparotomy was performed and upon opening the peritoneal cavity the presence of hundreds of areas of fat necrosis on the omentum and peritoneum and the escape of the 'beef broth' colored fluid at once confirmed the diagnosis. In another recent case I expressed the opinion that a patient, a woman of fifty-six, had a very virulent form of infection of the gall bladder complicating cholelithiasis on account of the extremely septic appearance of the patient, the high fever, and the absence of rigidity over the gall bladder region although tenderness was still present. Upon opening the peritoneal cavity we noted at once the presence of innumerable whitish areas on the

¹ *Surg. cal. Clin. cs. of Chicago* 1917 vol. 1 p. 1035.

omentum and suspensory ligament of the liver. The gall bladder was intensely inflamed and contained many calculi.

I have mentioned these two forms of acute pancreatitis because in the first case the clinical picture was that of the hyperacute type, while in the second patient the pancreatitis was of the acute or perhaps subacute form, in which the pancreatitis is milder and only a complication of an acute cholecystitis with or without calculi.

Recent articles by Deaver,¹ Watts,² and Linder³ have been of great service in calling our attention to the most important clinical features, as well as to the possibility of early operation if a diagnosis can be made.

There are three forms of acute pancreatitis according to Deaver, as follows:

(a) *Hyperacute*—Sudden onset, with most severe and steady pain lasting twenty-four hours in the epigastrium, accompanied by symptoms of shock and vomiting followed rapidly by those of collapse. The upper abdomen is distended, but not rigid or tender.

(b) *Acute*—Sudden, but less severe onset. The vomiting is a more marked feature and is accompanied by obstinate constipation, so that the clinical picture simulates that of an intestinal obstruction. The upper abdominal distention becomes more generalized, so that a spreading peritonitis from perforation of an upper abdominal hollow viscus is often thought of. There is a history of preceding attacks of gall-stones in many cases. Suppuration with the formation of a soft, tender mass follows, as a rule, in this form.

(c) *Subacute*—The symptoms resemble those of an acute cholecystitis with or without calculi; i. e., pain in the epigastrium, vomiting, etc. Very often a cholecystitis accompanies the pancreatitis, as in my second case referred to above, and may have been the cause of the subacute pancreatitis.

The differential diagnosis is well summed up by Watts as follows:

¹ Jour Amer Med. Assoc., 1917, 69, 434.

² Ann. Surg., 1918, 67, 278.

³ Jour Amer Med. Assoc., 1917, 69, 266.

Perforated gastric or duodenal ulcer

1 History of gastric disturbances

2 Marked rigidity and tenderness (early) in epigastrium

3 Higher temperature and white blood count

Ileus.

1 Pain severe, but not as intense as in pancreatitis

2 Collapse comes on slower

3 Vomiting and obstipation most marked feature

Acute pancreatitis.

1 Pain agonizing, but no rigidity and but little tenderness

2 Rapid onset of collapse symptoms

3 Upper abdominal distention gradually spreads to other regions

4 Vomiting and obstipation not as prominent a feature as in ileus

Having taken up the acute affections of the upper abdominal viscera (excepting the spleen), I shall discuss the diagnosis of the remainder of the acute abdominal conditions in our next lecture

CLINIC OF DR WESLEY J WOOLSTON

COOK COUNTY HOSPITAL

MALIGNANT DISEASE OF THE CERVICAL STUMP AFTER SUPRAVAGINAL HYSTERECTOMY

Summary Demonstration of a patient who developed carcinoma of the cervical stump three years after supravaginal hysterectomy for fibroid summary of 60 reported cases

THREE years ago this patient was admitted to the Gynecological Service at the Cook County Hospital with the following complaint

The patient has been able to feel a large mass in the lower abdomen. Complaints of pain in back and sides when on her feet. Has had dysmenorrhea, flatulence, constipation, frequency of urination, and leukorrhea of a brownish color, but not hemorrhagic.

The first symptom which she noticed three years ago was a frequent desire to urinate and the development of a cystocele. After her attention had been called to it she noticed a tumor mass in her abdomen which she could easily feel. There have been no hemorrhages during the past year. Menstruation has been as usual, with the exception of dysmenorrhea. Patient feels well, although she thinks she has been losing weight. She has no cough and there are no lung findings, no edema of the feet, no shortness of breath. She has frequent attacks of headache and a slight neuralgia of the face. She gets up two or three times at night to urinate.

Sexual History—Menstruation began at twelve years, twenty-eight-day type, duration seven days, dysmenorrhea. Last period began November 6, 1914, and was similar to others in all respects.

Obstetric History—Married for twenty three years The oldest child is twenty-one years old and the youngest child is twelve years old She had one miscarriage eighteen years ago She has had leukorrhea for twenty-one years Patient was torn at time of delivery Puerperium was normal each time

Past History—Measles, whooping-cough and mumps.

Physical Examination.—The patient is a well nourished colored woman who does not look ill Head and neck are negative Pupils are normal and react to light and accommodation. Teeth are in good shape Cervical glands are not palpable. Thyroid gland is somewhat enlarged Thorax is well developed and symmetric. Apices are resonant and lower borders are movable Breath sounds are vesicular and there are no rales. Heart sounds are distant, but regular in rhythm and intensity, no murmurs

Abdominal walls are muscular The lower abdomen is pendulous and is filled with a hard tumor mass extending to the umbilicus There is no tenderness or muscle spasm

Pelvis—Introitus is relaxed Cystocele present There is a white discharge present The cervix is large and indurated, and the entire pelvis is filled by a large nodular, firm and immovable mass continuous with the uterus

Clinical diagnosis is cystocele lacerated cervix and fibroid of the uterus

Examination of the blood shows 8700 leukocytes and 80 per cent hemoglobin

Urine is negative

The patient was operated at that time the operation consisting of an anterior colporrhaphy perineorrhaphy supravaginal hysterectomy and appendectomy leaving the left ovary

Present History—The patient returned to Cook County Hospital January 5 1918 with the following history

Since the last operation she had been in fairly good health, except for bladder trouble until last March when she began to bleed slightly from the vagina Since that time the bleeding has become somewhat worse each month, at times being con

tinuous There were periods of a week or more when there would be no bleeding For the last two months the bleeding has been excessive She has been under medical care, the doctor giving her some medicine internally The day before Christmas the patient bled excessively, and a physician who was called advised her to go to the hospital

Present Complaint—Bleeding from vagina, chills and fever, loss of weight The chills came on December 24th, lasted from one to five minutes, and recurred at frequent intervals, followed by slight elevations of temperature The loss of weight has been gradual, about 15 pounds in the last year

Family history is negative Has one son twenty four years of age, living and well

Habits are good Urnates two to three times at night

Physical Examination—Head, neck, and chest are negative Abdomen shows the scar from the previous operation No tumors are palpable and there is no tenderness There are no palpable inguinal glands Perineum is normal No edema of extremities and knee jerks are normal

Blood pressure is 112 systolic and 60 diastolic

Vaginal examination shows the anterior vaginal wall relaxed, tender, and bulging somewhat The cervix is low, quite large, edematous, and bleeds easily The os admits one finger

Diagnosis is carcinoma of the cervix

Operation—After the usual preparation the vagina and cervix were swabbed with tincture of iodine A median abdominal incision was then made, excising the old scar The ureters were located at the pelvic brim and the peritoneum was incised over them as far as the broad ligaments At this point they were followed through the broad ligaments by blunt dissection, and a ligature was passed around the uterine vessels as far out as possible through this opening The bladder was pushed back to the point of exposing the anterior vaginal wall Two large clamps were then placed on the upper portion of the vagina, which was then cut across The cervical stump, upper portion of the vagina and parametrium as far out as our ligatures were then removed Enlarged glands along the iliac vessels and in

the parametrium about the ligatures were then searched for but none found although several glands were removed.

The regular operation for this condition could not be done as conditions following the supravaginal hysterectomy were present which made it necessary to change our technic. The first operator had peritonized the tissues so well that few adhesions were present. The ovary left *in situ* at the first operation had become cystic because of the cutting off of its blood supply. It was removed.

Pathologic report showed a squamous-celled carcinoma but due to a misunderstanding slides were not made of the parametrium adjacent to the line of incision so we are not sure that our incisions were all made in healthy tissue.

Comments—In reviewing the literature on this subject we find that about 60 cases have been reported. Chrobak¹ was probably the first to call attention to the possibility of the development of this condition. He reported 3 cases of which 2 were carcinoma and 1 sarcoma.

In this country Currier² was perhaps the first to report cases of this kind. Dr. Veader Newton Leonard³ of Baltimore reports 2 cases and gives a very interesting review of the literature on the subject.

In view of the fact that malignancy does sometimes occur in the cervical stump after supravaginal hysterectomy the argument has arisen as to the operation of choice in the removal of the uterus. Botzong⁴ in 724 cases of supravaginal hysterectomy collected from representative European clinics reports a primary mortality of 2.61 per cent. while in 499 cases of panhysterectomy the mortality was 6.6 per cent.

When we consider the fact that fewer than 60 cases of this condition have been reported and that thousands of hysterectomies have been performed one is led to believe that the condition is not at all as common as we might suppose. Then when we consider that a complete hysterectomy is nearly three times as dangerous as the supravaginal in the absence of a cervical lesion that we might call a precancerous condition we feel justified in doing the latter operation. However we must

feel quite sure that the cervix is free from any possible chance of malignancy. The majority of operators seem to feel that a supravaginal hysterectomy is preferable to a complete hysterectomy on account of the greater danger in the latter operation.

Since carcinoma sometimes occurs in myoma of the uterus, it would be well to have a microscopic examination made of these cases, especially where the myoma occurs near the cervix. Many of the cases reported show that the malignancy was no doubt present at the time of operation. The majority of the cases reported followed myomata uteri, as did our own case.

Botzong,⁶ Currier,⁷ Fleishmann,⁸ Freund,⁹ Hargraves,⁷ Kaufman,⁸ Leonard,⁸ Lewis,⁹ Newman,¹⁰ Noble,¹¹ Norris,¹² Quenu,¹³ Savor,¹⁴ Turner,¹⁵ and Von Ehrlach¹⁶ each report 1 case of carcinoma of the cervical stump occurring in from six months to seven years after supravaginal hysterectomy for myoma of the uterus.

Wehmer,¹⁷ Chrobak,¹ Manton,¹⁸ and Menge¹⁹ each report a case of sarcoma of the cervical stump occurring from three to nine months after supravaginal hysterectomy.

Landinski²⁰ reports 2 cases of carcinoma following hysterectomy for pelvic infection and ovarian cysts eight years and three years later respectively.

Jacobs²¹ reports 2 cases of carcinoma following hysterectomy for myoma each one month after operation. The condition was almost certainly coexisting in these cases.

Chaput²² reports 4 cases of carcinoma following pelvic infection from one to six years after operation.

Oldshausen²³ reports 2 cases of carcinoma, one following myoma of the uterus, the other of unknown origin, both seven years later.

Schenk²⁴ reports 1 case of carcinoma four years after the removal of a large uterine tumor.

Lempe²⁵ reports a case of carcinoma eighteen months after hysterectomy for pelvic infection.

Richelot²⁶ reports 3 cases occurring from six months to three years after supravaginal hysterectomy for myoma of the uterus. In his article he refers to Hartman²⁷ and Murtry,²⁸ who had

the parametrium about the ligatures were then searched for, but none found, although several glands were removed.

The regular operation for this condition could not be done, as conditions following the supravaginal hysterectomy were present which made it necessary to change our technic. The first operator had peritonized the tissues so well that few adhesions were present. The ovary left *in situ* at the first operation had become cystic because of the cutting off of its blood-supply. It was removed.

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- 24 Schenk Arch f Gynak, vol lxi Table a, 18
- 25 Lempe Surg, Gyn., and Obst, vol xvi, p 104
- 26 Richelot Bull de l'acad de Med de Par, 1903, p 222
- 27 Hartmann Bull et Mem de la Soc de Chir de Par, 1897
- 28 Murtry Quoted by Richelot (20)
- 29 Le Dentu Quoted by Richelot (20)
- 30 Pean Quoted by Richelot (20)
- 31 Christopher Martin Centralbl f Gynak, 1902, p 103
- 32 Von Hacker Quoted by Savor (21)
- 33 Pawlik Quoted by Savor (21)
- 34 Batigne La Gynec, 1903, p 522
- 35 Condamin Soc du Chir de Lyon, 1900, p 40
- 36 Krusen and Hammond Brit Gynec, Jour (?), 1905, p 66
- 37 Cullen Myoma of the Uterus 1909, W B Saunders Co, of Philadelphia
- 38 Kelly Op Gyn, 1906, vol ii, p 265

CLINIC OF DR. EDWARD L. MOORHEAD

MERCY HOSPITAL

A SHOW CLINIC: PRESENTATION OF FIVE CASES

- Summary* Case I External urethrotomy—a few points in technic—how to locate opening of urethra into bladder
Case II Fracture of both bones of left forearm—fixation by Lane plate.
Case III Fracture of pelvis—non interference
Case IV Fracture of tibia—reduction by open operation
Case V. Splenectomy for pernicious anemia—diagnosis—preparatory transfusions, historic sketch, indication and contra indications for splenectomy

EXTERNAL URETHROTOMY

OUR first patient this morning is forty-eight years of age, a clerk by occupation, and was admitted to the hospital April 19, 1918, on account of retention of urine

He gives a history of an attack of gonorrhea twenty years ago. About fifteen years ago there was retention of urine, which was treated by passing of sounds and a metal catheter. Following this there has been more or less difficulty in urination, it being slow, dribbling, and painful, resulting finally in this attack of retention. This retention was relieved for the time being and the patient given urotropin (5 grains q. i. d.)

Upon examination with sounds there was found to be an impassable stricture of the deep urethra. You all know the indications for external urethrotomy—strictures of the deep urethra, which are dense and unyielding, impassable stricture, and stricture complicated by extravasation of urine, perineal abscess, fistula, attacks of retention, chronic cystitis, which can only be relieved by perineal section and drainage.

The patient having been prepared in the usual manner, I performed an external urethrotomy on him yesterday. There is nothing new that I can tell you regarding the operation, but a point or two might be emphasized which simplifies the operation a little.

the plate in line, and avoid buckling or tilting of the edges of the plate. This wound healed primarily. the plate remains *in situ* and the patient is now using the arm without discomfort.

I want to call your attention especially to this patient. He is of great surgical interest to us when I tell you that previous to his coming here he has taken an anesthetic on forty seven different

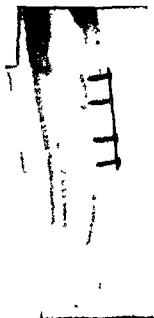


Fig. 258



Fig. 259

Figs. 258 and 259—Fracture of both bones of the forearm—open reduction and internal fixation with Lane plate

occasions for plastic work upon his nose. He says that his nose was destroyed by lupus vulgaris and when he was about eighteen years of age he began his series of operations to improve the deformity. In this he has been unfortunate as you can see from the many scars upon his arms and body and yet the operations have failed to provide him with a nose. He tells me that this work has been done by men whose names you all know if

First when the urethra is opened upon the sound or grooved staff pick up either side of the urethra with a fine suture drawing each to one side with the staff withdrawn partly and turned out of the perineal wound the apex of the triangle is the point at which the opening of the urethra into the bladder should be. Attention to this point will frequently save a great deal of time and avoidance of making false attempts to enter the bladder. Again after the introduction of the catheter into the bladder I am in the habit of tacking it with one small perineal suture tied in a bow knot merely to avoid its expulsion during the first few days.

During my intern days it was necessary for me one night to replace a catheter in the bladder of a patient operated upon that day where no provision was made to retain the catheter and the memory of the experience has always remained with me.

The patient is quite comfortable the bladder may be irrigated for the present cystitis and after a few days the catheter will be withdrawn. In the after treatment it is well to have these patients report each month for a short time and pass a sound.

FRACTURE OF BOTH BONES OF LEFT FOREARM

This patient is forty two years of age an artist by occupation and was admitted to Mercy Hospital with a history of having been struck across the left forearm with a piece of gas-pipe while engaged in a fight. The forearm was slightly swollen and upon motion pain was severe and crepitus obtained.

The x ray plate shows that the injury produced a fracture of radius and ulna about the junction of the middle and lower thirds (Fig 258). The following day an attempt was made to reduce the fracture and a cast applied. While the position was apparently good the x ray plate showed that there was overlapping of the fractured ends of the bones. March 12th an operation was performed and a plate with four screws applied to the radius. The result is as you see (Fig 259) practically a perfect apposition of the ends of the radius and the position of the ulna is very good without applying a plate to it. Just a word about applying plates in bone work. Try to drive the screws straight keep ng

no urgent necessity for any surgical operation. The following day the urine showed a slight amount of blood and there was also occult blood in the feces. The pulse was 100 and the temperature 101° F. During the next two days the pulse and temperature returned to normal.

From the x ray plate which was made shortly after admission to the hospital you can see the injury produced to the pelvic bones (Fig. 260). There is a fracture of the ascending ramus of the ischium of the left side and also a slight separation of the ilium from ischium of the same side.

I show you this case not for what we did but more for what we did not do. Primarily the case was referred to me for operation for a supposed rupture of the bladder with extravasation of urine but her condition was such that I considered waiting the best treatment. Today eighteen days following the injury the child is able to walk perfectly, there are no signs of any swellings and both urine and feces are normal.

FRACTURE OF TIBIA

This woman is forty three years of age and gives us the following history. Five years ago she had rheumatism which she says principally involved her left knee joint. This was treated by extension and the application of a cast. Ankylosis of the knee joint was the result.

November 1917 an operation was performed to relieve the ankylosis and by March 2 1918 the patient states she was able to move about with the aid of one crutch. On this date she slipped and fell producing an injury to the limb below the knee joint. She was removed to a hospital where on March 6 1918 a posterior molded splint was applied to the limb. April 2 1918 the patient was admitted to my service in Mercy Hospital. Patient states that she was told to go about on crutches but was unable to do so and hence she changed hospitals. I do not care to say much regarding this case except that upon examination we find that the knee joint is ankylosed and there is an oblique fracture of the head of the tibia from 1 to 2½ inches below the articular surface with a backward displacement of the lower

I should mention them and I assure you that the failures have not been due to any lack of skill or ability on their part

FRACTURE OF PELVIS

This little girl is six years of age. She was referred to me for operation about twenty four hours after receiving an injury from being run over by an automobile. One wheel of the auto-



FIG. 260—Radiogram showing fracture ascending ramus of ischium and partial separation of ilium from pubis and chondro-s.

mobile passed over her body from above the crest of the ilium on the right side to her left thigh. Following the injury the child vomited and there was blood in the urine and also in the stool. When she was admitted to Mercy Hospital there was a swelling above the pubes and to the right side which was quite painful to the touch. The general condition of the child was good. There was no shock and I decided there was

April 9 1918 an open operation was made and the fractured ends of the tibia were brought into apposition by the application of a plate It is now nearly four weeks since the operation the wound healed nicely and the plate remains We will allow the patient about six weeks from the time of operation before beginning to use the limb

SPLENECTOMY FOR PERNICIOUS ANEMIA

I am very much pleased to present this lady to you this morning We are indebted to my brother Dr J J Moorhead who is associated with me for this case Some of you may remember her she was shown at the clinic in January Briefly the history is She is forty nine years of age Her illness began two years ago At first it was noticed that she became tired very easily would get out of breath have palpitation of the heart upon the least exertion and that she was gradually growing paler Following this the digestive organs became disturbed and there was loss of appetite some nausea and vomiting Notwithstanding the fact that she received treatment of various kinds her condition gradually grew worse Last year she resided in the South for about six months and thought that she received some benefit from it However upon her return to this city her condition became bad again At the time of her entrance to Mercy Hospital January 15 1918 the blood picture was Leukocytes 5100 Erythrocytes 1 176 000 Hemoglobin 40 per cent

Differential

Poikilocytes	19	Microcytes	20
Megalocytes	28	Normal	33
		Megaloblasts	occasional

The patient was extremely pale She had lost considerable weight The spleen was easily felt She was given sodium cacodylate and a highly nutritious diet in the hope of producing some improvement

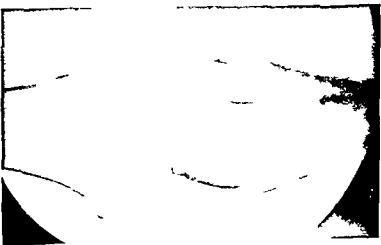
On February 24 1918 she was transfused 800 c c of blood by the citrate method The blood count then showed Leukocytes 5100 Erythrocytes 1 948 200

On March 4 1918 she was again transfused 800 c c. of blood

fragment and no bony union. Of course you can quite readily understand that any attempt at motion made a false joint at the site of fracture.



1 X 2 2



1 X 2 2

The x ray plates show very clearly the position of the fractured bone (Figs 261 and 262)

CLINIC OF DR. GOLDER L. McWHORTER

PRESBYTERIAN HOSPITAL

SURGICAL TREATMENT OF NEEDLES IN THE HAND

Summary Six cases illustrating the technique of removal of needles from the hand
necessity of x ray plates advantages of removal under fluoroscopic screen

THE removal of broken needles from tissues is one of the most difficult of surgical procedures due first, to the inability to palpate them, second, to the danger to adjacent tissues of searching for them with a cutting instrument, and third to the inability to see them until they have been dissected out. The fluoroscope is of great assistance in such cases and is a great improvement over the time-consuming extensive, and too often fruitless dissection. A summary of 72 cases at Bellevue Hospital of needles in the hands and feet may serve as an illustration of the difficulty of removal by dissection for in 53 per cent of the cases the needle could not be located at the first operation. Of the 53 per cent, 13 per cent were re-operated 24 per cent of the needles being removed at the second operation 10 per cent were operated twice without success 5 per cent of the needles were discovered at the third trial and one patient was operated five times before the needle was found.

Many localizers have been advocated some being accurate, but very elaborate requiring special apparatus. Bulkley¹ shows the advantages of the microphone in removing needles. The profundometer method as described by Flint,² has proved satisfactory in the trunk. This consists of localizing a foreign body in two planes and of marking the points on a malleable ring, fitted to the body and then of comparing a tracing from it with a cross section of the body at this level. Baese's³ method while requiring special apparatus is one of the quickest and most

by the citrate method The blood-count then showed Leukocytes, 5300 Erythrocytes, 2,400,000

March 13, 1918, the spleen was removed The patient reacted nicely from the operation and her convalescence was uneventful

March 21, 1918, the blood count was Leukocytes 7200 Erythrocytes, 2,664 000 Hemoglobin 60 per cent.

The patient left the hospital on March 28th, and she now returns to tell us how well she feels From general appearances, we will all agree with her as to the great improvement in her condition She states that she has not felt so well in years, is able to work about the house, walk considerable distance without becoming tired, has a good appetite, and has gained 30 pounds in weight The blood count now is Leukocytes, 6400 Erythrocytes, 4,100 000 Hemoglobin, 70 per cent

The spleen was about half again as large as normal and showed evidence of chronic splenitis

Splenectomy, if we can believe medical history, is not a new operation, but was done for various causes by the ancients In 1581 Viard removed a spleen prolapsed through a wound Matthias, in 1678, removed a spleen for the same cause Quit tenbaum in 1826 and Kuchler in 1855 each removed an enlarged spleen, both cases dying within a few hours from hemorrhage

Spencer Wells removed a hypertrophic spleen in 1865, the patient dying within six days of either thrombosis or sepsis Pean, in 1867 successfully removed a cystic spleen

Splenectomy is indicated in certain cases of splenomegaly accompanied by hemolytic anemia and acholuric jaundice, in Banti's disease before the stage of hepatic cirrhosis, in splenomegaly of the Gaucher type, in certain cases of pernicious anemia associated with chronic splenitis, in some cases of hypertrophied spleen on account of danger of rupture or pressure on other organs, and in malarial hypertrophy with twisted pedicle

The contraindications are leukemia, erythemia, when adhesions are extensive, and in such general diseases as syphilis and tuberculosis In the collected statistics of splenectomy for all causes the mortality is about 22 per cent

However if the needle is not found after a preliminary short trial the fluoroscope should be used

The field of operation is covered with a sterile towel over which the fluoroscope is placed. The operator must work below the screen introducing a small pointed hemostat to determine the position of the needle. If it is not possible to grasp the needle with the hemostat the hand is placed at right angles the hemostat

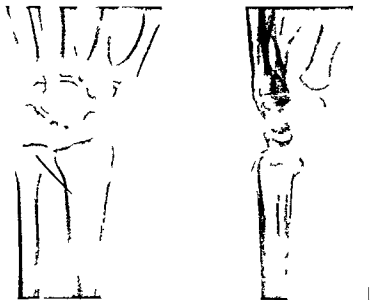


Fig. 263 The broken needle lying over the lower end of the radius and ulna (Case I)

withdrawn and reintroduced in the proper plane after which the needle is carefully withdrawn. Instead of turning the hand in order to determine whether the hemostat is near the needle the Poentgen tube may be moved. In case blunt dissection is undesirable one or more needles may be inserted in contact with the foreign body and used as a guide to dissect down to it.

All cases with needles in the tissues should be operated if seen early. If the needle has been in the tissues some time and

accurate In his method the anticathode of the tube and the fluoroscope are placed at opposite sides on a revolving apparatus, the foreign object is localized at the center, and since the length of the radius of this apparatus is known, the depth of the foreign body is found immediately by measuring to the surface of the body, and subtracting it from the length of the radius Bettman⁴ has adopted a small fluoroscopic screen, to be attached to the head of the operator and to be raised or lowered as necessary Knox⁵ enumerates the dangers to the patients and the operator of too long or frequent exposure in using the fluoroscope at operation He recommends the co-operation of the radiologist in the removal or the possible relocalization of the foreign body

The use of the ordinary horizontal couch with the Roentgen tube under it is very satisfactory for removing needles from the hand This is true because needles or similar foreign bodies in the extremities may be removed after the preliminary incision by blunt dissection under guidance of the fluoroscope In other regions important structures cannot be avoided so easily, and blunt dissection for obtaining a grasp of the foreign body becomes impossible

With the use of the fluoroscope several advantages are obtained First, a local anesthetic may be used, second a constrictor to control oozing is unnecessary, and, lastly and most important, the needle may be found through a small incision at the first attempt and in a short time, thus lessening the dangers of injury and infection.

Technic—For removal of needles from the hand the patient is placed on a table at one side of the Roentgen couch with the hand upon the couch. It is arranged with the usual sterile towels, with the hand prepared for operation A preliminary incision is made over the site least likely to injure important structures in the approach, and a careful dissection is made down to the approximate position of the needle as previously determined by Roentgen plates taken in two or more planes (Figs 263 and 264) or by fluoroscopy Since a careful dissection may immediately reveal the needle in the position shown, it will be unnecessary in many cases to use the fluoroscope at operation

incision was made the point seized, and the needle promptly removed

CASE III—J C, female, aged twenty two Patient ran broken needle in hand two days previously Roentgenogram revealed broken needle in palm of hand near base of middle finger Needle removed under local anesthesia by dissection without aid of fluoroscope

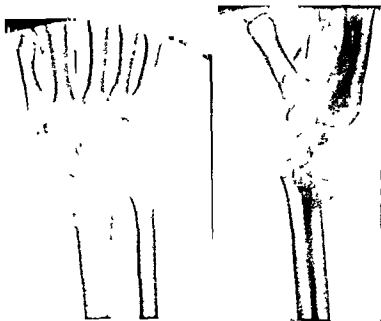


Fig. 265. Roentgenogram taken for fracture of radius reveals a broken needle which has been in the hand fifteen years at present causing no symptoms Needle not removed

CASE IV G G female Two weeks previous ran needle in base of palm Roentgenogram revealed needle deep in thenar eminence Needle removed after tedious dissection without fluoroscope under general anesthesia

CASE V Mrs B Patient broke needle in right wrist one week previous Was operated elsewhere under local anesthesia

is causing no chronic discharge infection pain or loss of function it may be allowed to remain (see Case VI)

In illustration of what I have just said I present a short abstract of 6 cases I have recently seen

CASE I—F D female aged forty Patient broke a needle off in her right wrist the day before examination Roentgenogram (Fig 263) reveals broken needle lying over radius and ulna Removed quickly by blunt dissection under fluoroscope after preliminary incision under local anesthesia



FIG 264—The needle wedged in the apex of the first metacarpal space Case II

CASE II—K A female aged forty nine Four months previously patient ran needle in hand and had little discomfort until recently when she found pain everywhere on using hand Roentgenogram (Fig 264) shows broken needle in the very apex of the first metacarpal space With local anesthesia an attempt was made to remove it under the fluoroscope by trying to grasp the broken end through a palmar incision This end was wedged between the bones and could not be grasped Therefore a dorsal

incision was made, the point seized, and the needle promptly removed

CASE III—J C female, aged twenty two Patient ran broken needle in hand two days previously Roentgenogram revealed broken needle in palm of hand near base of middle finger Needle removed under local anesthesia by dissection without aid of fluoroscope

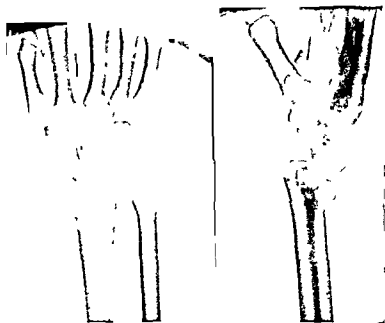


Fig 265 Roentgenogram taken for fracture of radius reveals a broken needle which has been in the hand fifteen years at present causing no symptoms Needle not removed

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CASE V Mrs B Patient broke needle in right wrist one week previous Was operated elsewhere under local anesthesia

two days before entrance with failure to find needle by dissection. Roentgenogram revealed needle lying anterior to radius and ulna in wrist. Needle removed from among deep tendons in wrist after long tedious dissection without aid of fluoroscope.

CASE VI—M. C. female aged fifty. Three months ago patient fell and broke wrist. She complained of loss of function since. Roentgenogram (Fig. 265) revealed broken needle in palm of hand. Patient states she stuck a needle in base of hand fifteen years ago but did not know it broke off there. Following this she had severe pain in her hand and was unable to use it for about eight months since which time she has had no symptoms from the needle. It was not removed.

These cases show clearly the necessity of good Roentgen ray work in this branch of surgery and especially emphasize the important place which should be given to the fluoroscope.

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ISOLATED AND COMPLETE DISLOCATION OF THE FIFTH CARPOMETACARPAL JOINT OPEN OPERATION

Synonym Rarity of uncomplicated dislocation of fifth metacarpal *technic of*
reduction by open operation *result* after three weeks

IN a careful review of the literature I have been able to find no record of a dislocation of the fifth carpometacarpal joint unaccompanied by other dislocations. However dislocations of the first carpometacarpal joint are of quite common occurrence without or with a fracture through the base (Bennet's fracture). This is largely explained by the exposed position of the first metacarpal to direct or indirect trauma especially in striking the thumb knuckle with the hand clenched and also by the difference in the type of articulation. The first joint is saddle shaped with a capsular ligament having considerable motion and consequently more liable to be dislocated than the last four joints which are arthrodial in type with very limited motion and bound together with strong dorsal palmar and interosseous ligaments.

Burk¹ was able to collect only 24 instances of single or multiple dislocations of the carpometacarpals with exception of the thumb and reported 1 case. He found that 40 of these metacarpal dislocations were dorsal and 70 anterior. The fifth metacarpus was dislocated seven times dorsally completely in all cases anteriorly five times three times completely. While isolated dislocations of all of the other metacarpals were reported the fifth was associated always with other dislocations. All metacarpals were dislocated in 3 cases the last four in 5 cases the first two in 4 cases. In one case the fifth metacarpus was dislocated anteriorly while the other metacarpals were dislocated dorsally.

One case is reported by Poulain and Poulain² of dorsal subluxation of the fifth metacarpus associated with dislocations of the second third and fourth. *Lop³ reports one case of anterior* dislocation of the fifth metacarpus associated with a subluxation

two days before entrance with failure to find needle by dissection. Roentgenogram revealed needle lying anterior to radius and ulna in wrist. Needle removed from among deep tendons in wrist after long tedious dissection without aid of fluoroscope.

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These cases show clearly the necessity of good Roentgen ray work in this branch of surgery and especially emphasize the important place which should be given to the fluoroscope.

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ISOLATED AND COMPLETE DISLOCATION OF THE FIFTH CARPOMETACARPAL JOINT. OPEN OPERATION

Summary Rarity of uncomplicated dislocation of fifth metacarpal technic of reduction by open operation result after three weeks

In a careful review of the literature I have been able to find no record of a dislocation of the fifth carpometacarpal joint unaccompanied by other dislocations. However, dislocations of the first carpometacarpal joint are of quite common occurrence without or with a fracture through the base (Bennet's fracture). This is largely explained by the exposed position of the first metacarpal to direct or indirect trauma, especially in striking the thumb knuckle with the hand clenched and also by the difference in the type of articulation. The first joint is saddle shaped with a capsular ligament having considerable motion and consequently more liable to be dislocated than the last four joints which are arthrodial in type with very limited motion and bound together with strong dorsal palmar and interosseous ligaments.

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One case reported by Poulain and Poulain² of dorsal subluxation of the fifth metacarpus associated with dislocations of the second third and fourth. Lop³ reports one case of anterior dislocation of the fifth metacarpus associated with a subluxation

of the metacarpophalangeal joint and a severe lymphangitis preventing early reduction. He operated after twelve days obtaining a good functional result. The reduction of dislocations of the last four metacarpals is reported to be simple by extension and pressure if seen early. In old cases reduction is impossible.²

This patient, a young man aged twenty three, entered the Presbyterian Hospital April 27, 1918, and was discharged May



Fig. 266—Complete isolated anterolateral dislocation of base of fifth metacarpal

6, 1918. Two weeks before entering the hospital he fell on his right hand with the fifth finger extended and struck the side of the hand over the metacarpus. The pain was severe, the hand became very swollen, and there was complete loss of function. The fingers were in a fixed, semiflexed position. The roentgenogram (Fig. 266) revealed the fifth metacarpus dislocated so that the base was anterior to the third. The shadow of the process of the os hamatum extended toward the shaft and might easily have been confused with a fracture with separation of a part

of the base The prominence of the fifth metacarpus could not be definitely palpated because of the swelling of the palm

Operation (April 30, 1918) Ether anesthesia An attempt at reduction of the dislocation was made without an operation. The middle of the palm was placed longitudinally on the edge of a



Fig. 267 — After operation—satisfactory reduction The shadow of the hamulus process extends across the joint Marked functional recovery in three weeks

triangular block and extension of the little finger was made with pressure of the block against the displaced base of the fifth metacarpus The bone was immovable and an open operation was necessary An incision was made on the dorsum of the hand over the usual location of the shaft and base of the fifth meta

carpus The base and shaft were found as shown in the roentgenogram anteriorly displaced and in the middle of the palm over the third metacarpal bone The displaced bone was firmly surrounded by edematous muscle and dense tissue The base was firmly fixed and resisted an attempt to pull it out with a hook around the shaft I then passed the hook directly around the base pulled the bone free and placed it in a normal position The base of the fifth metacarpus was absolutely bare of any ligament or tendon attachment The extensor and flexor carpi ulnaris had been torn away with the joint ligaments and also some of the muscles attached to the shaft A catgut suture was tied around the base attached to the torn ligaments present on the os hamatum and to the torn extensor carpi ulnaris tendon A roll of gauze was placed longitudinally in the palm to prevent a tendency to displacement Molded splints extending to the elbow were put on anteriorly and dorsally with the fingers straight and a tongue depressor splint was placed on the medial side of the hand bridging over the base of the metacarpal to prevent pressure upon it from the roller bandage

The roentgenogram (Fig 761) taken after operation reveals a normal position of the bones One week later the wound was healed and the splints shortened to allow use of fingers At the end of two weeks daily massage was given and in three weeks as you see there is good function

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CLINIC OF DR HARRY CULVER

COOK COUNTY HOSPITAL

PYELONEPHRITIS

Summary Routes of infection—importance of lymphatic transmission hematogenous infection the ascending intra ureteric route predisposing causes—causal organisms—colon bacillus in 85 per cent of all cases the three cardinal symptoms—chills and fever pain in the back painful frequent urination and agnosia—necessity of careful differentiation—twenty one errors in a series of 90 patients with proved pyelonephritis entering the Cook County Hospital in 1917, illustrative cases treatment—relation to the bacteriologic diagnosis—the value of irrigation of the renal pelvis

THE unsettled state of the question of renal infections has led to considerable experimental and clinical investigation, the results of which thus far have tended to make the confusion more pronounced than ever

This is especially true of the routes of transmission Until recently it was thought that all renal infection was transmitted directly from the bladder by way of the lumen of the ureter This idea was finally discarded, since it was thought impossible for bacteria to travel against gravity and the urinary current, this method of infection being possible only in the presence of obstruction to the emptying of the bladder, or mechanical or inflammatory narrowing of the ureter, either condition causing the accumulation of urine in the kidney pelvis Draper and Braasch failed to produce ascending infections unless a high intravesical pressure was maintained over a considerable time, while Caulk suggests that there must be an incompetent ureterovesical valve associated with increased vesical pressure before infection can possibly occur by way of the lumen of the ureter

How are the many instances of so called ascending urinary infection to be explained, since the usual direct route is no longer considered a possibility in the ordinary case?

A vast amount of work has been done on the extension of vesical tuberculosis to the kidneys by way of the lymphatics,

and more recently this path has been emphasized as being a possible route of non tuberculous infection by Sweet and Stewart, Eisendrath, and others. It has been found that there is an indirect lymphatic connection between the bladder and the renal pelvis, and a similar indirect connection between the pelvis and the various divisions of the renal parenchyma. Sigmura found the lower part of the ureters constantly involved in a series of cases of acute cystitis. This he considers due to lymphatic transmission, as the mucous membrane showed only slight involvement, while the lymph-channels and adventitia were markedly involved. Francke has demonstrated a direct lymphatic connection between the right kidney capsule and the ascending colon. Attention has been directed toward the anastomoses of the lymphatics of the female genitalia with those of the bladder and ureters which may explain the many instances of vesical and renal infection following pelvic operations. This finding also serves to explain the numerous infections during pregnancy and the puerperium as well as the many renal infections in young girls, since 50 per cent. of infant girls examined give a positive colon bacillus culture from the vagina on the second day after birth.

Sweet and Stewart concluded that the extension of infection occurs along the lymphatics of the ureteral wall. This contention is based upon experimental work in which uretero-intestinal anastomoses were made with a constant production of renal infection. Eisendrath has been able to trace the course of infection from the bladder to the kidneys through the lymphatics of the ureteral wall. This was done by making serial sections of the ureters and kidneys. These infections were produced by intravesical inoculation of various pyogenic micro-organisms into dogs with previously sterile urines. As the cultures of the blood taken just before death were found sterile he concluded that the ureteral lymphatics transmitted the infection and suggests that similar lymphatic connection may carry infection from the prostate and seminal vesicles in the male and from the pelvic organs of the female to the kidneys without obstruction to the urethra or ureter and with an intact ureterovesical valve.

The theory that renal infection for the most part is blood borne has been made a prominent one by the work of Cabot and Crabtree. They point out that such insoluble substances as fat and cinnabar pass through healthy kidneys, and direct attention to the work of Biedl and Kraus who found that colon and anthrax bacilli as well as staphylococci can pass through a normal kidney without the production of lesions. It has been claimed that 10 per cent of all pulmonary tuberculous patients pass tubercle bacilli in the urine even in the presence of apparently normal kidneys. These pyogenic organisms however are capable of producing marked renal lesions under proper conditions. The severity of the lesion produced depends upon the type and virulence of the bacteria together with the local condition of the kidney and the general resistance of the individual. Cabot and Crabtree obtained colon bacilli from blood-cultures in 40 per cent of their patients suffering from acute pyelonephritis. They cite instances where positive blood cultures were obtained before the organisms were found in the urine. These studies were made on prostatitis with indwelling catheters so that an opportunity was presented to study patients from the very onset of infection. There is much experimental and clinical evidence now at hand to substantiate their contention that cortical abscesses, capsulitis, capsule abscess, multiple septic infarcts, perinephritic abscesses are produced by coccus infections for the most part while the colon group of organisms tend to infect the pelvis and adjacent collecting tubules. The bacillary infections cause severe disturbance of renal function and often early marked prostration of the patient but rarely require surgical intervention while the coccus infections although not usually causing marked early distress and decrease of renal function are much more liable to need surgical treatment some time during the course of the infection.

This selective activity of these groups of bacteria for different parts of the kidney tissue is apparently associated with their pus forming ability. Those organisms which cause few leukocytes to be called out organisms of relatively low pathogenicity, may move through the kidney tissue without mechanical obstruction, while other bacteria which at once produce leukocytosis,

local and general, and are considered of greater pathogenicity, are mechanically obstructed and produce lesions where they first find lodgment. This serves to explain why the pus producing staphylococcus causes renal parenchymal lesions, and the less pyogenic colon bacillus tends to pass through the renal tissue and primarily involve the renal pelvis.

Cabot and Crabtree suggest that the chief rôle of the lymphatics in the transmission of renal infection is to spread the infection throughout the kidney once a local hematogenous focus has been established. Almost never is a single portion of a kidney involved in an infectious process, and then only when an abnormality of the kidney, such as double pelvis or a blocked-off portion of a single pelvis, exists. It is generally conceded that most renal coccal infections are blood borne, as seen following such conditions as furunculosis and osteomyelitis. Why then should colon bacillus infections have an entirely different route of transmission? These authors believe that the lymphatic connection between the bladder and kidneys is long and indirect, and suggest that most probably organisms do enter the vesical and ureteral lymphatics to be emptied into the blood stream and then produce renal infection. This assertion is supported by the work of Thiele and Emberton, who found that organisms injected intraperitoneally reach the blood-stream and are excreted by the kidneys, but if the thoracic duct of the laboratory animal be opened so that the bacteria can escape no such excretion takes place.

The recent work of David further complicates the matter, as his findings support the old idea of ascending infection directly up the lumen of the ureter. By carefully controlling his experiments on dogs he found that in many instances supposedly normal animals have cellular infiltration of the ureteral wall. He therefore emphasizes the fact that a diagnosis of ascending infection on this finding alone in experimental animals is not sufficient. In all his experiments David made a division and ligation of the right ureter near the bladder, which was inoculated with colon bacilli. The dogs were killed by ether in from one to three days after the inoculation. David's conclusions are as follows:

1 The injection of colon bacilli into unobstructed non traumatized bladders is not followed by cellular exudate in the submucosa and muscularis in most instances

2 *Bacillus coli* may be isolated from the urine of unobstructed non traumatized bladders showing *no evidence of microscopic infection* as late as a month after its injection into the bladder

3 Acute high grade cystitis in unobstructed and obstructed bladders is not accompanied by blood stream infection

4 Cystitis in unobstructed bladders is not commonly accompanied by extension of the infection to the upper urinary tract

5 It is possible in an unobstructed bladder to infect the upper urinary tract by direct extension of the infection from the bladder through the lumen of the ureter

6 Cystitis in partially obstructed bladders is very frequently accompanied by the presence of the organism in the ureter and pelvis of the kidney and this extension may take place by the lumen of the ureter or by direct involvement of the ureter by contiguity or possibly by way of the peri ureteral lymphatics and *infection of the subpelvic tissue*

7 Evidence is presented to show that ascending *Bacillus coli* infection of the upper urinary tract from the bladder travels most frequently by the lumen of the ureter

8 Peri ureteral infiltration is present only when peritoneal exudate of the bladder or pelvic peritoneal exudate is also present

9 Peri ureteral or subpelvic exudate is not synonymous with infection of the urinary stream

10 In the presence of peri ureteral or subpelvic infiltration the kidney parenchyma is negative in most cases

David's conclusions are based on accurate bacteriologic and pathologic work and must have a bearing in some instances of ascending infection from an infection in the bladder. However it is a well known fact that in over a third of the instances of renal infections there is absolutely no involvement of the bladder. Clinically the involvement of the bladder appears to be secondary to the renal infection in most cases. This direct route of infection by way of the lumen of the ureter is most apt to occur as

seen by experiment, when there is partial obstruction to the urinary outlet. This finding also tends to reduce the importance of this route of transmission, since a very small percentage of patients have any such urinary obstruction. In a series of renal infections recently studied I found but three instances of partial urethral obstruction among 116 patients.

From a careful investigation of all the work on the routes of transmission of renal infection one must conclude that under certain modifying conditions all three theories still deserve recognition.

Infection occurs in kidneys otherwise normal, but a kidney already the site of disease, malposition, or maldevelopment is much more susceptible. Individual constitutional disorders, such as furunculosis, gastro-intestinal disturbances, tonsillitis, prostatitis, seminal vesiculitis, and osteomyelitis, often predispose to renal infection and in many instances no primary focus can be found.

The organisms most commonly found are colon bacilli and staphylococci, and less commonly the streptococcus *Bacillus pyocyaneus*, and others still more rarely. By far the commonest organism found is the colon bacillus which appears in from 50 to 90 per cent. of all cases, while the staphylococcus comes second and is found in 10 to 20 per cent. of all cases. These two organisms occurring together in not a small number of infections. These instances of mixed infection are supposed by some observers to be primarily staphylococcus infections upon which the colon bacillus has been implanted as a secondary invader. There is no clinical or experimental evidence to support this belief. In a series of 116 patients I found *Bacillus coli* in pure culture in 74 per cent. of the patients, staphylococci in pure

mixed infections. Other organisms as the streptococcus, typhoid bacillus, *pyocyaneus* and diphtheroid bacilli, and leptothrix, were found but altogether they represent less than 5 per cent. of all the infections.

Side Infected —The usual report shows that the right kidney is more susceptible to infection than the left according to the supporters of the lymph stream as the route of bacterial transmission. This fact is explained by the lymphatic connection between the ascending colon and the capsule of the right kidney. Others reason that the increased mobility of the right kidney renders it more susceptible to hyperemia and therefore more easily infected by organisms which are at times being deposited in it from the blood stream. It has been said that all cases of renal infection are bilateral except instances of septic infarction or in those in which there is a pre existing lesion or anomaly of one kidney. Most statistical reports do not agree with the above statement. I found 58.7 per cent of 116 patients had bilateral infections and 41.3 per cent had unilateral infections. Of the unilaterals 48 per cent were on the left side and 52 per cent on the right side.

Symptomatology —While a complete understanding of the mode of transmission of these infections is not possible it is equally difficult to comprehend the source of such an enormous and varied symptomatology. In typical cases there are certain symptoms and findings which are logically associated with the infection. There are other patients however whose symptoms are altogether atypical and the infection often goes on and on unrecognized until severe destruction of the kidney has taken place many patients being subjected to unnecessary surgical operations on a wrong diagnosis.

Three symptoms are most commonly complained of namely

bacteriologically from the patient complaining of typical symptoms. Some of the less common symptoms are here mentioned in the order of their numeric importance as they appeared in an analysis of a series of patients previously mentioned. Constipation, headache, vomiting, pain in the abdomen, hematuria, loss of weight, pain in the abdomen and back, incontinence of urine, pain over the bladder, retention of urine, pain in the neck

and legs. Many of these symptoms naturally when not associated with others more nearly referable to the cause would not suggest the condition but it should always be kept in mind that some renal infections cause symptoms referable to some distant organ and therefore misinterpreted. All symptoms vary in intensity and type but especially is this true of pain in the back which may be dull and boring over one or both lumbar regions but may be acute and radiating along the course of the ureter simulating renal colic. The acute back pains are often associated with more distressing abdominal pains. Good judgment must often be exercised to rule out the peritoneal cavity and its contents as the cause of these symptoms.

The temperature of the patients is in a general way dependent upon the acuteness of the infection. In all instances it is of the intermittent type and ranges from 105° F. to normal. Many severe chronic infections run a normal temperature constantly.

Blood Examination.—Leukocyte counts of the peripheral blood vary with the acuteness or chronicity of the infection and vary from 40 000 per c.mm. in the acute cases to normal counts in the renal chronic cases. I have made blood-cultures on 10 different patients at various times during their infection and have been unable to get a positive culture. Most of these cultures were taken at the height of their fever curve and soon after a chill.

Bladder Urine—The colon bacillus infections usually present marked bladder urine findings. While the staphylococcus infections as a rule do not cause so much bladder pus it is even considered anatomically and bacteriologically possible to find staphylococci present in the bladder having been excreted by the infected kidneys with no demonstrable leukocytes. In suspected cases however repeated careful examinations of centrifuged specimens from the bladder will give many positive findings where single examinations are negative. Renal infection cannot be ruled out on the finding of a single normal bladder specimen.

Cystoscopic Findings—While a majority of patients suffering from pyelonephritis have bladder symptoms and positive bladder

cystoscopic findings, about one third of the bladders associated with such infection are apparently perfectly normal, and this in spite of the constant presence of septic urine. Those with moderate bladder findings predominating present a loss of normal luster, with hyperemia about the trigone, usually most marked about the ureteral orifice, from which the septic urine is coming. A small percentage of patients present marked vesical changes characterized by generalized hyperemia associated with more or less edema, usually localized. Bladder observation is often difficult due to the mucopurulent material present and to the relative intolerance of the bladder to the distending medium. This type of bladder closely resembles those seen with tuberculous involvement, and requires considerable local treatment before the primary cause of the infection can be ascertained by ureteral catheterization. The bladder symptoms seem not to be altogether dependent upon the condition of the bladder, as many patients with apparently normal bladders complain equally as much as some with marked vesical changes, a fact explained on the basis of reflex pain not unlike that seen with renal pelvic stone with bladder symptoms.

Diagnosis—This can often be suspected on the symptoms but can only be absolutely made on a careful examination of the bladder urine, followed by ureteral catheterization with a study of the separate urines microscopically and bacteriologically. Renal function tests and radiography together with pyelography may be necessary in classifying the renal lesion.

Physical findings while often not present are important as confirmatory evidence but not of much importance in making an absolute diagnosis. Palpation may elicit tenderness in the costovertebral angle, most marked when the perirenal tissues are involved. Absence of this tenderness is of no significance. Tenderness and enlargement of the infected kidney is sometimes made out and is of considerable value as additional evidence if it is remembered that the compensatory change of the healthy kidney incident to its increased work may produce these findings. The diagnosis under which 90 patients with proved pyelonephritis entered the Cook County Hospital in 1917 are here given.

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Diagnosis	Number of patients
Cystitis	12
Pyelitis	10
Renal calculus	8
Pneumonia	8
Salpingitis	7
Typhoid fever	6
Appendicitis	6
Nephritis	4
Abdominal tumor	4
Pleurisy	3
Renal tuberculosis	3
Sciatica	3
Cholecystitis	3
Hysteria	2
Hematuria	2
Uterine fibroids	2
Acute bronchitis	2
Influenza	2
Papilloma of the bladder	1
Malaria	1
Meningitis	1

While these diagnoses represent conclusions rapidly made they serve to emphasize in a very striking manner the conditions which renal infections may simulate and from which they must be distinguished. As previously mentioned and noted in the above table acute abdominal conditions are closely simulated. This fact has been made emphatic by the occasional laparotomy performed finding the abdominal organs normal. Some innocent structure is usually removed during the operation on the operator's guess that it may be the seat of disease. After the operative recovery however the symptoms continue as before. The records of a few personal observations may serve to strengthen this point.

Mrs. V. T. White female aged thirty-eight developed severe pain in the right upper quadrant of the abdomen two

L. V. C. — confined

accompanied by pains in her back. She was operated at once for retroposition of the uterus with no relief so four weeks later a

perineal repair was done. The symptoms were not influenced so she tried another hospital where a diagnosis of gall bladder disease was made. On exploration this structure was found normal. After operative recovery she was cystoscoped and found to have a right sided pyelonephritis (colon bacillus). Her symptoms have entirely disappeared with the cure of this infection.

Other instances similar to the above are numerous and only a few will be briefly mentioned.

H J Female aged twenty six. Diagnosis hysteria. Pain in right lower quadrant. Appendix removed—no relief. Bilateral colon bacillus infection. Cured.

A H Female aged thirty five. Diagnosis cystocele. Pain in right side both upper and lower quadrants. Ovary and tube on right side removed two months ago with the appendix—no relief. Right sided colon bacillus pyelonephritis. Symptoms subsided with improvement of the infection.

S O Female aged twenty four. Diagnosis salpingitis. Pain in lower right abdomen. Appendix removed six months ago with no relief. Staphylococcus infection of the upper pole of the right kidney. Complete ureteral reduplication. Relief of symptoms but organisms still present.

L J Female aged forty three. Pain in back and limbs. Diagnosis sciatica. Symptoms four years. Cholecystectomy one year ago—no relief. Bilateral colon bacillus pyelonephritis.

E M Female aged nineteen. Pain in lower lumbar region for nine months. Left ovariectomy nine months ago—no relief. Left sided pyelonephritis (colon bacillus). Cured.

J R Male aged twenty seven. Diagnosis kidney stone. Pain in right lower quadrant of abdomen. Appendectomy one month ago—no relief. Right sided staphylococcus pyelonephritis. Complete relief of symptoms.

Treatment—The treatment of pyelonephritis consists of several considerations any or all of which may apply to an individual case. On the other hand there are many patients to whom some of these principles do not apply.

If the infection is found to be due to urethral obstruction it is

imperative that this obstruction be relieved before the infection can be influenced. Should the infection producing the obstruction be ureteral this must be similarly relieved. Equally as important as relieving local renal and bladder conditions is the removal of septic foci present elsewhere in the body which may act as distributing foci for organisms into the blood or lymph stream to be carried either directly or indirectly to the kidney. Hence attention must be directed toward instances of intestinal stasis. Teeth, tonsil, prostate and seminal vesicle infection should be removed as well as the various infections of the uterus and its adnexa.

With the removal of these factors which deal more directly with the etiology of the infection, there are certain other agents that may be applied more directly against the disease itself than the removal of its cause.

Urinary antiseptics are found to have an important place in the treatment of these infections. Especially is this so of hexamethylenamin when given in sufficient dosage in the presence of acid urine. It has been shown that its antiseptic value is due to the formaldehyd liberated which process takes place only in the presence of an acid medium. Since members of the colon bacillus group for the most part produce acid during their development it is not necessary to further acidify this urine. However in the presence of staphylococcus infection the ingestion of acid sodium phosphate in 15 grain doses three times a day multiplies the antiseptic action of the hexamethylenamin. The maximum of formaldehyd is liberated within a few hours after the administration of hexamethylenamin, hence the practice of giving small doses often repeated is not justified. Overdoses of this drug indeed are to be avoided since it is prone to produce renal and bladder irritation not only aggravating the symptoms but renal hematuria may readily be produced. It is best to start with 10 grain doses three times a day and within a few days increase the dose to 15 grains further increase depending upon the tolerance of the patient. Certain intolerant patients are found who cannot take this drug in sufficient dosage to be of any value. To these salol has been given with benefit.

As previously mentioned the colon bacillus tends to produce acid and requires acid medium for its maximum development. An alkaline medium while not completely inhibiting the growth of these organisms tends to produce adverse conditions for development. One seems justified in producing such a reaction when this infection is present. For this purpose clinically sodium bicarbonate in dram doses or sodium citrate in 15 grain doses to be increased until the urine is distinctly alkaline seems to give the desired results.

For colon bacillus infections the giving of hexamethylenamin for a week alternating with alkaline therapy for a week has produced the greatest therapeutic response and should be given a trial in all instances.

Excepting in the very acute cases the above treatment should be carried out with moderate diuresis produced by the ingestion of large quantities of water.

The treatment by renal pelvis irrigation is still the cause of considerable discussion. Some do not irrigate but advocate drainage by ureteral catheterization while others seem not content with either. One cannot resist adoption of one or the other of these methods after watching patients completely relieved of symptoms by one irrigation and bacteriologically cured after three or four irrigations.

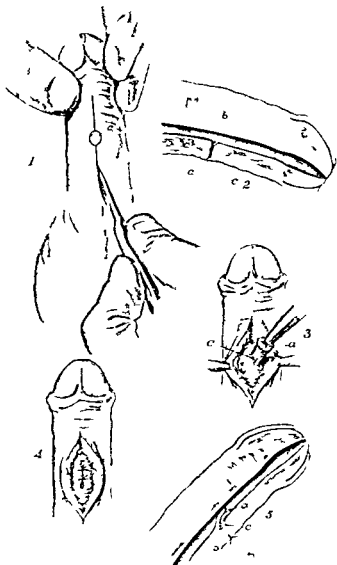
The relief of symptoms is not synonymous with cure as patients are frequently seen leaving the hospital free from symptoms but with urines positive for the infecting organism to return within a few months with a complete recurrence of symptoms and the bacterial findings of the first examination. It is logical to assume that during this symptomless period the organisms though still present are inactive but any factor which appears tending to lower local or general resistance causes increased bacterial activity with a recurrence of symptoms. Therefore in all cases possible treatment should be continued until the infection has disappeared. This can be determined only by repeated culture. It has been found that a relatively safe manner of determining this condition is to get two successive sterile urines from the infected kidney one week apart.

The determination of cure in these patients is similar to that required for the cure of the carrier state in typhoid fever wherein it is believed that two successive negative cultures from stool and urine is sufficient to declare the individual free from typhoid bacilli.

The passage of the ureteral catheter will in some instances produce a marked alleviation or complete subsidence of symptoms. Upon this finding it has been advocated that the benefits of pelvic lavage depend upon this factor entirely. Patients whose symptoms are due to ureteral obstruction inflammatory or otherwise may be relieved of symptoms by the passage of a ureteral catheter. This however, is not a bacteriologic cure as I have had the opportunity of examining such patients after the relief of symptoms and again with a recurrence of symptoms, and found the type of bacteria the same as that producing the original infection. The dangers of forcing infectious material into the secreting papillæ, while anatomically possible, is highly improbable when lavage is carefully performed.

It would seem conservative to perform lavage on all occasions where drainage by ureteral catheter is indicated, thereby getting the advantage of the drainage and the beneficial action of the medicament. Although the solution does not come in contact with all the infecting micro-organisms its action on the inflammatory tissues tends to increase local resistance. For this purpose 1 per cent silver nitrate has given good results and this drug may be used up to 5 per cent but there is no reason for using this strength. Many disinfecting drugs of various strengths are used as well as plain water, which acts beneficially in a mechanical way where suppuration is profuse.

As *Bacillus coli* infections are prone to occur in the pelvis of the kidney and adjacent tubules while coccus infections tend to localize in the parenchyma the irrigation treatment should give the better results in the colon infections. This supposition is supported by clinical facts, since it has been found impossible



from the adherent chronic inflammatory tissue. Above and below the fistula the inflammatory tissue is thoroughly excised. The fistula proper is thoroughly dissected (Fig 268, 2 and 3), but only at one point (Fig 268, 2) is all the inflammatory tissue removed up to the urethral mucosa. I wish to impress the fact that the dissection must be exceptionally carefully done at this point so as not to enter the fistulous tract or injure the mucosa. If the dissection is not perfect, invagination (Fig 268 5) cannot be carried out, because the fibrous tissue would be sufficiently elastic to cause the fistulous tract to invert itself or go back into its original position. If the dissection is perfect, the invagination is easily carried out and it remains inverted and the inverted edges remain in contact with each other without pressure or sutures. This gives a contact of raw surfaces depending on the length of the fistulous tract. In two of my cases the fistulous tract was more than $1\frac{1}{2}$ cm in length. This gives, therefore, a clean surface contact of this length in coaptation. Two superficial fine catgut sutures hold the point where the inversion has been carried out (Fig 268 4). After that the fascia as well as the skin is brought together in the ordinary manner with silk or horsehair sutures.

I have examined the cases in the course of two to four weeks after the operation with a urethroscope. In two cases where the fistula was immediately within the external urethral orifice the opening of the external urethral orifice showed the inverted fistulous tract. It protruded into the urethra just as an ordinary polyp. The surface was covered with mucosa. It was possible for me to snip off with scissors this little polyp-like mass, and the urethroscopic examination at a later date showed no change from the surrounding mucosa. In the other case where the fistulous inversion was in the pendulous portion of the urethra I was able to snip off with an intra urethral scissors the projecting

Fig 268—1 Incision to be made
 2 External and internal incision
 3 clearly dissected and
 4 mucosa exposed at c
 5 Operation completed fistulous tract invaginated into urethra

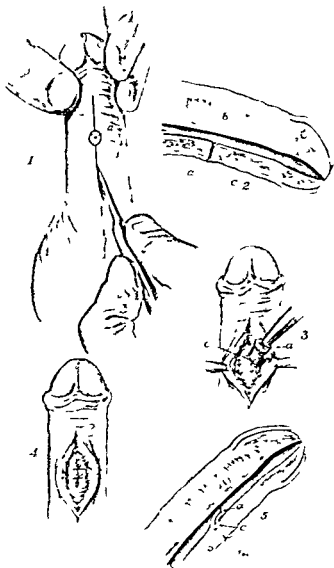


Fig 268

TECHNICAL ERRORS IN THE OPERATIVE TREATMENT OF URETHRAL STRICTURE

Summary Importance of exposing the urethral mucosa at the point of stricture and removal of scar tissue dangers of the Guiteras guide the retrostrictural pouch as a cause of persistent dribbling at the end of urination

IN connection with urethral work I wish also to take up some points in connection with the subject of stricture of the urethra. It has been my misfortune I might say, frequently to see cases that have been operated upon for stricture and where unsatisfactory results have been obtained. For this reason I think it worth while to point out a few of the little errors in the technique of external urethrotomy which permit of unsatisfactory results.

Take Fig 269 which represents a stricturous condition of the bulbomembranous urethra with a rather tortuous course of the urethra with the usual dilatation posterior to the stricture. External urethrotomy with a guide is a comparatively easy operative procedure. However, I might even say that frequently unsatisfactory results are obtained in these cases because all the surrounding inflammatory indurated tissue is allowed to remain in place. We begin even if a guide is passed to pass through the false opening and the course of the urethra is not followed (Fig 269, A). However the same thing occurs much more frequently in those cases where the operation is performed without a guide, and by examining Fig 270 the catheter which is placed in the bladder through the urethra is shown at the site of the operation not to pass through the urethra. The little distortions of the urethra have not been sufficiently carefully followed by the operator but the operator passes the urethral catheter so that it would appear at the site of the operation, and then beginning at the centripetal end easily passes directly into the bladder. Alongside of the catheter, as can be seen in this picture is also the perineal drain which I am accustomed to depend upon also. It is the failure to carefully split the entire urethra in the strictur

mass but I was also obliged to cauterize with nitrate of silver on account of a little granulating area which appeared. However this too healed satisfactorily. I had occasion to see one of these patients about a year after operation, and there were no ill effects of any kind.

In all instances at the same sitting I perform an external urethrotomy and insert a drain as a preliminary step to this operation for urethral fistula. I do this in order to keep the urethra free from urine passing over this area, and also to avoid catheterization in case retention would set in and also to avoid the irritation of a permanent catheter which some operators advise. At the time of operation a sound or urethroscope with mandarin is introduced into the urethra so as to permit of more careful dissection. After the inversion and closing of the wound a wick of iodoform gauze is placed into the urethra beyond the point of operation, and so that it will appear at the external urethral orifice through the urethroscopic tube. This wick is allowed to remain in place forty-eight to seventy-two hours. The perineal drain is removed in six to seven days.

order to do a retrograde catheterization and I might even say for any retrograde catheterization the same accident can take place and therefore the same results obtained as where this instrument is used through the operative site. This instrument is plunged through the point where the centripetal end is supposed to be located in the direction of the prostatic urethra so as to enter the bladder but as the drawing will show, the instrument is plunged through the prostate and oftentimes even

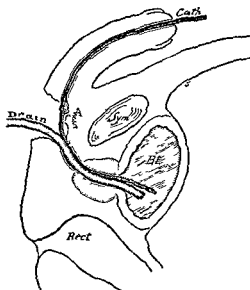


Fig 270—Incision to expose stricture the operator has failed to follow the urethra through the stricture—a common cause of failure to obtain cure

into the bladder at a point above or below the internal urethra orifice. These instruments have a groove on the upper surface so that they can be used as grooved directors. If the instrument has been plunged into the bladder and the withdrawal of the mandarin permits the urine to escape the operator believes that he has entered the bladder through the urethra. Then the little groove is used to direct the scalpel and the incision is made sufficiently large for the introduction of the catheter. Of course a perineal drain can also be introduced at the same time

ous area and the failure to remove the chronic inflammatory tissue which surrounds these portions that prevents satisfactory results

I make it a habit of always following and naturally one must be able to recognize, the urethral mucosa. If it is at all possible the upper wall of the urethral mucosa should remain intact no matter how much of the urethral wall it is necessary to remove. Then when the catheter is placed correctly it remains at least in

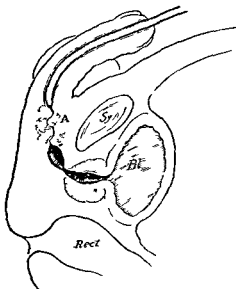


Fig. 269.—Sound introduced into urethra up to point of stricture (A). Note dilatation of urethra proximal to stricture—the retrostrictural pouch.

contact with the urethral mucosa the entire distance from bladder to the external urethral orifice.

Another one of the reasons for unsatisfactory results in connection with this line of work is the use of such instruments as the Guiteras guide (Fig. 271). This instrument as well as others of this type has been recommended to be used in those cases where the centripetal end cannot be found. Under those circumstances, in order to avoid a suprapubic cystotomy, in

attempts at passing sounds are usually followed by chills and fever. Perineal abscesses result and it becomes necessary to reoperate in such a way as to correct the false passage and also to remove the inflammatory mass as well as to find the centripetal end and obtain a continuous mucosa if this is possible.

Another cause of unsatisfactory results has been that the operator has permitted the retrostrictural pouch to persist. In other words the cutting of the stricture is oftentimes not sufficient. If the pouch is permitted to remain a good deal of dribbling at the end of the urinary act may persist. I have been in the habit in these cases of excising the lower portion of the sac sufficient mucosa remaining to bring the edges together over the catheter which has been introduced into the bladder. These little matters in connection with external urethrotomies if attended to at the time of operation will always give satisfactory results.

It is not at all objectionable whenever necessary to make a resection of the urethra. Whenever it is possible the upper wall of the urethra should be brought together with fine catgut. Naturally if an end to end anastomosis can be carried out in a clean case it should be done. There are a great many other little technical details which must be observed in order to get good results in individual cases but these few have repeatedly come to my notice.

I have repeatedly seen dire results follow these procedures and for this reason I thought it desirable to point out what I consider poor technic and the cause of these unnecessarily poor results. If the perineal drain and catheter have been removed

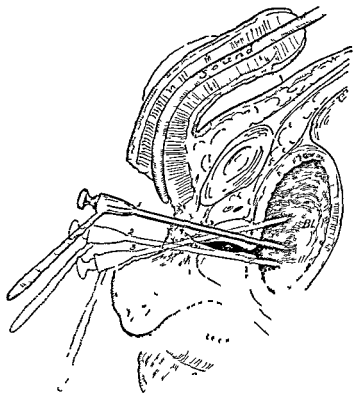


Fig. 271—Errors in the introduction of the Gutteras guide—failure to follow the urethral mucosa.

in the course of three to ten days, it is perfectly true that the patient will pass urine for a short period of time if the perineal wound has been perfectly healed through the urethra. As a rule, it is scarcely a month until the patient again complains of inability to pass urine with any degree of comfort or ease and

CLINIC OF DR HERMAN L KRETSCHMER

PRESBYTERIAN HOSPITAL

FULGURATION TREATMENT OF TUMORS OF THE BLADDER

Summary Fulguration as an incentive to careful study of bladder tumors, 'recurrences' and 'new tumors', technic of fulguration, source of current—type of current factors influencing duration of treatment—pain, hemorrhage, burning, size of tumor, the instruments—method and site of application the high frequency current as a diagnostic aid reaction edema of bladder wall—importance of its recognition

June 28, 1918

WE are very fortunate this morning in being able to demonstrate two cases of bladder papillomata in various stages of the disease. One, a woman who has a small papilloma and comes to us for bladder distress and hematuria. The second patient is a man with recurring papillomata. Both cases illustrate the value of using the high frequency spark in the treatment of bladder papillomata.

There can be no question but that the study of the entire subject of tumors of the bladder has received a distinct stimulus through the introduction of the high frequency treatment by Dr Edwin Beer of New York. Not only has the high frequency treatment surpassed all other forms of treatment of papillary tumors of the bladder, but it has served as an incentive for closer observation of the patients that have been cured of their tumors. In other words, patients are repeatedly cystoscoped at definite intervals after the tumors have disappeared. Many of the cases of recurrences are thus seen when the tumors are small and can be very successfully treated by one application of the high frequency spark. Many of these so-called recurrences should be differentiated from new tumors. In the strict application of the

was obliged to arise once at night. The condition has not materially changed since its onset.

Suprapubic Pain—For the past six weeks patient has had more or less pain in the suprapubic region and around the scar of the previous operation.

Physical Examination—General physical examination is negative.

x Ray examination for the presence of stone in the urinary tract is negative.

Examination of the urine shows acid reaction specific gravity 1005 albumin present blood present no sugar. Examination of the sediment shows the presence of pus red blood cells and bacilli. Culture of the urine shows the presence of a pure culture of *Bacillus coli*.

The first cystoscopic examination showed the presence of an exceedingly large papillary tumor in the apex of the bladder apparently taking its origin from the suprapubic scar. Several similar papillomata are found around the internal urethral orifice and there are seen multiple papillomata around the ureteral orifices and on the base of the bladder.

The patient was advised to go to the Presbyterian Hospital for fulguration treatment.

Since the fulguration treatment was instituted the patient has received a total of twelve treatments. Cystoscopic examination today shows complete disappearance of all the tumors around the sphincter and of many of the smaller tumors on the base of the bladder and around the ureteral orifices. There is present a large tumor or a part of a large tumor in the apex of the bladder and one large tumor behind the left ureteral orifice. We will fulgurate the patient this morning using the bipolar current.

Technic—The patient is prepared as any patient is for cystoscopic examination. The bladder is filled with sterile water and the operating cystoscope is introduced through the urethra. After the cystoscope is introduced the presence of a tumor in the apex of the bladder can very plainly be seen. That this tumor is in the apex of the bladder can be demonstrated by the fact

word "recurrence" is meant, or should be meant, the presence of a tumor at the site in which the former tumor was found. Careful cystoscopic examination in cases of supposed recurrence has definitely proved that this is not always true, that many of the patients who come back present new tumors and these tumors are to be found in parts remote from the original tumor. Thus, for example, one occasionally sees the primary tumor situated behind the ureteral orifice, and the recurrence is found on the margin of the sphincter or perhaps in the apex of the bladder, or perhaps behind the opposite ureteral orifice, so that I am becoming firmly convinced of the fact that although we see numbers of these cases that have but one tumor, I cannot help but feel that if such patients were examined at a later date multiple tumors of varying size would be found.

The fulguration treatment is particularly applicable to these so-called recurrences because the patient is seen at a time when the tumor is small, and one treatment usually suffices to cause a complete disappearance of the tumor. In the group of cases in which the patient has been operated upon, as in one of the cases you will see this morning, the patient is always more willing to submit to fulguration than to an open operation. Open operations, as is well known, are followed by recurrences in more than 50 per cent of the cases. If the fulguration treatment can reduce this large percentage of recurrences it surely is a step in the right direction.

CASE I—Mr W McD single by occupation a clerk thirty four years of age

Previous History—Eight years ago the patient was operated upon for a papilloma of the bladder. The usual suprapubic operation was performed. The patient had a rather protracted convalescence. He was free from urinary symptoms for six years. Two years ago the patient noticed that his urine again became bloody and attacks of hematuria have been noted at intervals ever since.

Present Complaint—Hematuria of two years' duration

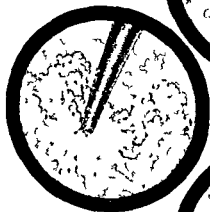
Frequency of Urination—Began three months ago so that patient was obliged to void every three hours during the day and



1



2

The J. R. R.

3



that we are looking toward the apex of the bladder with the cystoscope, and, furthermore, by the fact that an air bubble is visible at the margin of the tumor (Plate I, Fig 1)

Source of the Current—The high frequency current necessary for carrying out this method of treatment is obtained from an apparatus made by Wappler, of New York. The apparatus I use is one of the earliest made by Wappler, and has given us very satisfactory service. Since this machine was designed several modifications have been made, but these do not possess any advantage over this type of machine which is portable.

Type of Current—For this work two types of current may be used. At first a unipolar, or Oudin current, was employed. This rendered us very good service. I believe that Beer uses this type of current at the present time. However, there have been several instances in which it seemed to me that the current was not strong enough to effect a complete cure, that is, to cause all the tumor to disappear. It was then decided to use the bipolar, or D'Arsonval, current. We feel that this type of current has given us the best results and it is the one now used as a matter of routine.

One pole is placed in the bladder by means of the McCarthy electrode which consists of a large ureteral catheter carrying on its end a metal tip. Inside of the catheter is a wire which carries the current for the heavily insulated electrode. With this electrode there is less danger of short-circuiting of the current into the cystoscope, which may at times amount to a good deal, so that the current does not come out at the end of the electrode and does not, of course, accomplish what we aim to do. The second pole is placed in one of two places depending upon the location of the tumor. If the tumor is situated in the apex of the bladder, the large flat metallic plate is placed on the abdomen in the suprapubic region. In case the tumor is found on the base of the bladder this flat plate is placed under the buttocks.

In my fulguration work I have always used the operating cystoscope made by Wappler, of New York. By looking through the cystoscope you will see that the electrode has been carried out into the bladder cavity and has been placed against the sur-

face of the papillary tumor By means of the foot switch the current is now turned on and the fulguration is started If everything is in working order two phenomena may be seen There can always be seen the emanation of bubbles from the end of the electrode This is supposed to be due to hydrogen gas There soon follows a blanching of the surface of the tumor, so that the tumor becomes white and loses its usual papillary appearance As the fulguration is carried on the entire surface of the tumor becomes white and appears necrotic (Plate I Figs 2, 3, 4) In this manner the entire tumor is treated by means of the high frequency current

The duration of the fulguration depends upon several factors, chief of which are First, the patient, second, the operator, and third, the instruments

The Patient—Under this heading we first may take up the following (a) Pain, (b) hemorrhage, (c) danger of burning, (d) size of tumor

Pain—As long as the intravesical electrode remains in contact with the tumor no pain is experienced by the patient When working with the base of the tumor or if the electrode comes in contact with the bladder wall the patient very frequently complains of pain As a rule during the first fulguration there is no pain whereas toward the end of the treatment when working near the bladder wall, in treating the remaining tags, the patient at times complains of pain In instances in which the tumors are very large many applications may be made without the patient's being inconvenienced thereby In cases in which the tumors are small or where small tumors are to be found on the margin of the sphincter, the patient does experience a certain amount of pain which, however, lasts for only five or ten seconds, or as long as the current is being applied to the small papillary tumors

Hemorrhage—As a rule in treating papillomata the fulguration immediately stops the bleeding for which the patients come to us Occasionally where the tumors have been given a good deal of treatment a large area of necrotic tumor results, and when this sloughs away the patients have a good deal of hemorrhage We therefore warn the patients of this possibility

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way causing the tumor to be severed from its base in one treatment. In this way we would accomplish just exactly what the advocates of the snare treatment accomplish. While theoretically this may seem an easy procedure, in large papillary tumors it is almost impossible, because one cannot always find the pedicle and hence cannot apply the electrode to it.

In large tumors we have always worked from the periphery rather than from the base, and while it may take a few more treatments, it has always seemed to me to be the safer procedure because of the greater ease with which one can direct the end of the electrode through the cystoscope to the surface of the tumor than to the pedicle.

There are certain limitations to this form of treatment for papillary tumors of the bladder, which I have met but three times. A singular fact in these three instances was that the patients were all males and that they were all very fat, so that one would have much preferred to have operated through the cystoscope than to carry out a suprapubic cystotomy, which procedure became necessary owing to the fact that the tumors were very large and very well pedunculated and situated near the neck of the bladder. The facts in these three cases were such that cystoscopic examination could be carried out so that one could see the large papillary tumor, but because of the size of the tumor its position and its long pedicle it was absolutely impossible to manipulate the operating cystoscope and to see just where the electrode was being applied. In each of these instances many repeated attempts to use fulguration failed, and in two of the instances this was carried out under anesthesia, believing that one should not open the bladder for treatment of papilloma if it is at all possible to treat them by means of the high frequency current.

It has also been advised that the high frequency current may be used as a differential diagnostic aid in determining whether a given tumor is malignant or benign. Benign papillary tumors respond very promptly to this form of treatment, so that it may be set forth as a clinical axiom that if a tumor does not respond to several repeated fulgurations it is probably malignant, in spite of

by telling them that in about a week when the necrotic tissue comes away there may be a certain amount of bleeding. In our hands this has never been serious enough to alarm us, and if the patients are warned of this possibility they are not frightened.

Danger of Burning the Bladder Wall—This should always be borne in mind when the tumors are small or when treating the fragments that remain after the large tumors have been fulgurated. While I have personally never met with this condition, I know of one instance in which the operator burned a hole through the bladder, so that immediate laparotomy was necessary.

Size of the Tumor—As mentioned above, the size of the tumor determines the number of treatments. Small ones generally yield to one or, at most, two treatments. In this case today the patient has received up to date twelve fulgurations, and we have not yet succeeded in completely freeing him of the tumors.

The Operator—From the operator's end the duration of the treatment may be long or short, depending upon his perseverance.

Instruments—Short-circuiting the cystoscope so that the light is burned out. While this was rather a frequent occurrence in our early work, it has been practically eliminated by careful attention to cords, rheostat, and fulguration electrode.

In order to reduce the number of fulgurations required in the treatment of very large papillomata one may reduce the size of the papillary tumor by means of intravesical operations. In one or two instances we have done this by using a cystoscopic rongeur devised by Young of Baltimore. Instead of this procedure one may employ the old operating cystoscope of Nitze, and with a cold snare remove the major portion of the tumor. After this has been removed one can then fulgurate the base by means of the high frequency current. The latter method I have never employed, though it has been reported as eminently successful by several workers abroad.

The ideal way, of course, to remove these tumors in the least possible number of treatments would be to apply the fulguration current directly to the pedicle, burning through it, and in this

tuna on one occasion At the present time there is no pain or burning on urination

The patient has noticed on certain occasions that there is a sudden stoppage of the urinary stream Never passed any stones or gravel

The history of the epigastric distress, nervousness, and presence of a lump in her throat do not interest us very much, so we will pass over these points in her history

Menstruation is negative, with the exception of shooting pains that she complained of ever since its beginning Pain is present in the lower left abdomen during menstruation, but does not come on regularly every month

Examination by Dr Ralph Brown—Head neck, heart and lungs are negative Nasopharyngeal area shows no pus Sinuses clear Tonsils are submerged No pus Cheesy material in upper pole on right side

Abdomen Colon is palpable, otherwise negative Reflexes O K

Pelvic Examination—Body of uterus is very much enlarged, lying off toward the right side Cervix projects toward the left and is rather soft The uterus is movable and moderately retroflexed

æ Ray examination for stone in the urinary tract is negative

Examination of the blood shows 4 820,000 red cells, 9000 leukocytes and 90 per cent hemoglobin Blood pressure is 120 systolic and 80 diastolic

Examination of urine shows specific gravity 1021, acid, trace of albumin no casts, epithelial cells few, and leukocytes few Cultures of urine sterile

The problem in this case evidently is a twofold one First, the presence of blood in the urine means the presence of organic disease somewhere in the urinary tract Second owing to the fact that she has a retroflexion of the uterus and that the uterus is enlarged and soft the problem for discussion comes up as to whether or not the bladder distress was not secondary to the pathologic condition in the pelvic organs It therefore seemed advisable to exclude any organic disease in the urinary tract to

the fact that it may have the cystoscopic appearance of a benign tumor. While this is a good working rule, one should not rely on it too closely, for in several instances in which large pieces of the tumor were removed with the rongeur and careful histologic study made of them, a diagnosis of malignant tumor was made from the histologic section, yet these patients were successfully fulgurated and there has been no recurrence of the tumor over a period of three years. In the treatment of frank carcinomata of the bladder this treatment has not been of value. During the early period of its use in cases in which resection was not deemed advisable or feasible, suprapubic cystotomy was carried out and the cancerous growth very vigorously fulgurated through the suprapubic opening. In all instances in which this was carried out the patients were not cured, so that we believe that this form of treatment has no value and no place in the treatment of frank carcinomata of the bladder.

CASE II.—Mrs. C. J., female, aged thirty-seven, married, referred by Dr. B. W. Sippy and Dr. Ralph Brown.

This patient complains of the following symptoms: Pain in the neck, hematuria, epigastric distress, pain in the lower abdomen and rectum and frequency of urination. The frequency of urination began about six years ago and is just about the same now as it was when it began. There has not been much change in her symptoms. The number of times she is obliged to void at night is variable. She may go for a short period without getting up at all and at other times she may be obliged to arise three times at night.

Hematuria.—About two years ago the patient had an attack of hematuria. This came on without any pain and without any injury. Soon after urinating about 7:30 in the evening the patient felt a desire to void and upon urinating she found that the fluid was bright red in color. There was marked burning and a frequent desire thereafter. The first five or six urinations after this were very bright red and then gradually became darker and less in quantity. The catheterized specimen obtained the next day showed a very large quantity of blood-cells. Two weeks before entering the hospital the patient noticed a terminal hema-

is nothing left for us to fulgurate, and so there are many advantages in not making the treatments too close together in small tumors, whereas in large tumors the patient may be fulgurated three or four times a week, at least for the first week or two.

This morning we have shown you a recurrence of a papillary tumor in the male and the presence of a new papillary tumor in the female. The early literature, as you know, was very interesting on the relation of the occurrence of papillary tumors to the sexes. It was set down as exceedingly rare to find papillary tumors in women. Since the advent of careful work in genito-urinary surgery this old dogma has been completely disproved. Our own experience has been that papillomata occur in women in about 30 per cent of all cases. When I make this statement I refer to the simple benign papillomata.

In summing up the present status of the question of the treatment of benign papillomata of the bladder one may say

- 1 The fulguration treatment is without danger in the hands of those who are competent to carry it out.

- 2 The percentage of recurrences are decidedly less with this form of treatment than with open operation.

- 3 This form of treatment can be carried out in an ambulatory sort of a way, so that the patients spend only a day in the hospital. They are not obliged to take an anesthetic and they are spared the long convalescence that is always a part of the suprapubic operation.

- 4 While the mortality rate of suprapubic operation for papillary tumors is low, nevertheless there is a definite mortality with this form of treatment, which mortality is completely eliminated by the employment of fulguration.

- 5 It leads to a more careful postoperative study of our cases. These patients are more closely observed than they were before.

- 6 It has stimulated more universal microscopic study of these bladder tumors.

account for the presence of the blood. With this object in view we will cystoscope the patient.

Cystoscopic Examination—This shows that the posterior wall of the bladder seems to project inward as though pushed inward by some extravescical condition. Behind the right ureteral orifice can be seen a papillary tumor the size of a plum-stone.

We will therefore immediately fulgurate this patient using as we did in the first patient the D Arsenval current. Because this tumor is situated on the base of the bladder the plate will be placed under the hips. The current is now turned on and the tumor immediately becomes white as the tumor did in the man we just fulgurated. As you see now the entire tumor has been fulgurated and there is nothing left to suggest a papilloma except a white necrotic mass. We will instruct this patient to return for further observation in about three weeks.

In cases in which the tumor is not very large as in this instance certain reactions are produced in the bladder wall as the direct result of the high frequency current so that one can not always tell just where the base of the tumor ends and where the edema of reaction begins. For this reason we are going to instruct this woman to come back in three weeks at the end of this time most of this edema will have disappeared. This is important because if one does not wait until this reaction has disappeared one will fulgurate part of the bladder which really does not need it and simply produce more reaction and in this way do more harm than is really called for. This reaction should always be borne in mind and it has come to be universally recognized as a part of fulguration. In the early days of this work it was not recognized as such and there are instances on record in which the patients have left the doctor who fulgurated them and gone to someone else who cystoscoped them and found this peculiar condition. The second man not knowing what had

base of the tumor is sharply defined the treatment can be applied directly and not infrequently after this edema has subsided there

FULGURATION TREATMENT OF URETHRAL CARUNCLE

Summary Fulguration versus operation technic results in case demonstrated

URETHRAL caruncle is of rather frequent occurrence and is generally treated by operative removal of the caruncle a procedure which in itself can be carried out under local anesthesia and has always been regarded as a minor procedure. Recently however we have given up the idea of operative removal of urethral caruncle and have treated all caruncles that we have seen by means of the high frequency current a procedure which is very simple very efficacious and one that has rendered us very good service in the treatment of this condition.

The patient that we have for treatment this morning is Mrs F O S aged sixty two married and the mother of seven children.

Present Complaint—One day she noticed that a few drops of blood were flowing from her genital organs. Examination of her underwear showed it was blood stained. This discharge of blood occurred twice at intervals of a number of days. The second hemorrhage was more severe than the first. There were no urinary symptoms.

Examination—General examination is negative and pelvic examination is negative.

The external urethral orifice shows the presence of a caruncle about the size of a large bean situated at the lower margin of the external urethral orifice (Fig. 272).

By means of this large electrode we will apply the D Arsonval current and fulgurate this caruncle. As you see this takes but a few seconds and the entire caruncle has been converted into a necrotic mass (Fig. 272 A). We shall ask the patient to come back for observation in about ten days. If the caruncle has not been completely destroyed by this form of treatment another treatment can be applied.

Postscript—The patient came back to the hospital in ten days and examination showed complete disappearance of the caruncle.

CLINIC OF DR WILLIAM HESSERT

ALEXIAN BROTHERS HOSPITAL

A SURGICAL CLINIC ON FRACTURES¹

Summary Transverse fracture of the shaft of the humerus with musculospiral paralysis remarks on Colles fracture, oblique fracture of shaft of the right humerus with musculospiral paralysis acute osteomyelitis of the left tibia avulsion of the quadriceps tendon above the patella spiral fracture of the tibia spiral fracture of the tibia and fibula fracture of the os calcis comminuted fracture of the neck of the femur spiral fracture of the femur fracture of the neck of the femur impacted fracture of the neck of the femur compound comminuted fracture of tibia and fibula fracture of the neck of the femur, Pott's fracture

I FEEL greatly honored to have the privilege of speaking to you this afternoon and of showing you a few of our cases. This will be mostly a show clinic. I have requested some of my out patients whom I am treating for fracture to be present today, and with them and the cases we have at present in the hospital the clinical material ought to be interesting and instructive to you.

We have a great deal of emergency surgery in this hospital. We have considerable bone work and fractures of all kinds to deal with as you will see. Every one of the patients will teach us some lesson, and I will try and frame my remarks in such a way to point out the lesson that case has taught me and I trust will teach you.

The first patient (Case I) consented to come in from Bartlett, Illinois to be shown for your benefit. I will first demonstrate an old injury to the arm, which shows a late result after fracture of the humerus with musculospiral paralysis. A number of years ago this man sustained a transverse fracture of the

¹ Delivered before military surgeons Alexian Brothers Hospital, March 20 1918

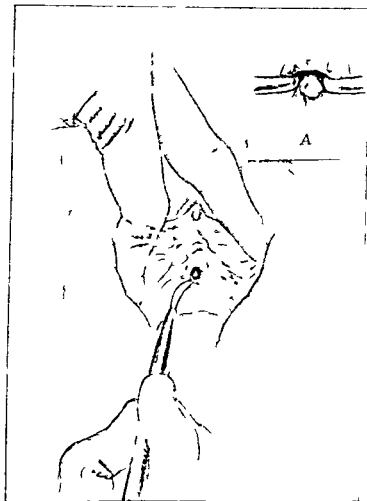


Fig. 27—Fulguration of caruncle labialis separated by burn of left hand.
 Insert A—Appearance of lesion at conclusion of treatment. Note white corded surface.

In its stead was seen a large ulcer which had been produced by fulguration. Later examination showed this completely healed.

the chances not as good as they were at first. What is the use of operating on a nerve that you know will recover after three or four months or more? But how do you know whether it is going to recover or not without operation? That is the crux of the whole question. If there is one point I want to impress upon you it is this: *You must make the earliest possible diagnosis of the condition as to its being primary or secondary* and you do that by examining in a routine manner for paralysis of the nerve at the time you first see the fracture.

This man had primary wrist-drop due as it was later disclosed to a complete division of the nerve. I cut down on the fracture within the first week and sutured the nerve. He was operated on before the days of Lane plates and Parham Martin bands. I wired the humerus with complete operative and functional recovery. Here is the important thing in making a prognosis. It takes from eight to twelve months for a nerve to recover its function after division when it is sutured. That is a long time. We have another man here who is just about well after nine months. The first patient's arm is perfectly well now and strong. The patient says it is as good as ever. This happened eleven years ago. That is not what he is here for today. He is here for another condition but I was glad the opportunity presented itself of showing the ultimate result of a nerve suture. It was about a year ago last September that he fell and sustained a Colles fracture which was reduced by a local doctor and two months later he came here on account of great deformity. Function was not good and having in mind to improve both the cosmetic and functional result I operated. That was in December 1916.

With chisel and saw the radius was divided the section beginning above several inches above the tip of the styloid process and extending downward and to the ulnar side. The idea was to correct both the radial inversion deformity and lengthen the bone. Great difficulty was encountered when it came to fixation of the fragments. Finally an intramedullary ivory peg was employed. One end of the peg rested in the medullary cavity of the upper fragment and the lower end was

shaft of the humerus at about the middle complicated with musculospiral paralysis. The first thing you have to do in a case of fracture of the shaft of the humerus after determining the existence of a fracture is to find out whether or not there is wrist-drop meaning involvement of the musculospiral nerve. In civil practice that is of extreme importance as well as in military practice. It is of paramount importance to know whether the paralysis is primary or secondary as it makes a great difference in the subsequent treatment and prognosis. Paralysis of the musculospiral nerve associated with fracture of the shaft of the humerus is of two kinds—primary and secondary. Primary paralysis usually occurs immediately on receipt of the injury and is due to a complete and immediate division of conductivity of the nerve. There is either complete severance of the nerve or such a severe contusion with partial division as to cut off the conductivity and you get immediate paralysis of the forearm extensors. We have secondary paralysis that occurs after a week or ten days or longer. The paralysis is not due to a complete and immediate severance of the nerve but to a pressure that gradually develops with the formation of callus the consolidation of blood-clot the pressure produced by unreduced bony fragments or improperly applied splints. Its onset is more slow than that of the primary paralysis.

Suppose a patient presents himself a few days after the fracture was sustained and you find he has a wrist-drop if you do not know whether it is a primary or secondary condition it is going to be impossible to institute the proper treatment. *Primary paralysis demands immediate operation.* That is my personal conviction. I do not believe you get this sufficiently emphasized in text books. Everything I tell you today is my own opinion based on my own experience and you can take it as such for what it is worth. Secondary paralysis gives hope of recovery without operation. That is a very important point for you to keep clearly in mind because if you allow a case with primary paralysis to go for a month or two or longer and there is no improvement you will have to operate anyway with

the chances not as good as they were at first. What is the use of operating on a nerve that you know will recover after three or four months or more? But how do you know whether it is going to recover or not without operation? That is the crux of the whole question. If there is one point I want to impress upon you it is this: *You must make the earliest possible diagnosis of the condition as to its being primary or secondary* and you do that by examining in a routine manner for paralysis of the nerve at the time you first see the fracture.

This man had primary wrist drop due as it was later disclosed to a complete division of the nerve. I cut down on the fracture within the first week and sutured the nerve. He was operated on before the days of Lane plates and Parham Martin bands. I wired the humerus with complete operative and functional recovery. Here is the important thing in making a prognosis. It takes from eight to twelve months for a nerve to recover its function after division when it is sutured. That is a long time. We have another man here who is just about well after nine months. The first patient's arm is perfectly well now and strong. The patient says it is as good as ever. This happened eleven years ago. That is not what he is here for today. He is here for another condition but I was glad the opportunity presented itself of showing the ultimate result of a nerve suture. It was about a year ago last September that he fell and sustained a Colles fracture which was reduced by a local doctor and two months later he came here on account of great deformity. Function was not good and having in mind to improve both the cosmetic and functional result I operated. That was in December 1916.

With chisel and saw the radius was divided the section beginning above several inches above the tip of the styloid process and extending downward and to the ulnar side. The idea was to correct both the radial inversion deformity and lengthen the bone. Great difficulty was encountered when it came to fixation of the fragments. Finally an intramedullary ivory peg was employed. One end of the peg rested in the medullary cavity of the upper fragment and the lower end was

fixed in a groove on the lower fragment. This arrangement seemed to work very well at the time and held the fragments in good position. The wound healed without infection, but, to my great disappointment, there seemed no inclination toward union. Week after week the wrist was anxiously examined but while



Fig. 2-3



Fig. 2-4

Fig. 2-3—Ununited fracture of radius shows great deformity and iron peg slipped up in medullary cavity of upper fragment.

Fig. 2-4—Anteroposterior view does not reveal the extent of deformity. Note altered relation of lower end of radius and ulna. Iron peg is seen dimly.

the position at first remained correct the bones would not unite firmly. After wearing the splints two months the patient insisted upon their removal and a leather wrist support was worn. The man now began to work with the injured arm with the result that from month to month a deformity developed which was at first slight but after six months became very marked.

(Fig 273) The deformity pain and disability finally became such as to demand correction so I decided to operate upon him again. The second operation was performed December 28 1917 as follows

The seat of fracture was exposed and the deformity corrected. The ends of the fragments were freshened but first of all I started to remove the ivory peg. This was not as easy as you might imagine for the peg had slipped way up in the medullary cavity and the more you tried to grasp it the higher up it slipped. It was finally necessary to open the medullary cavity before the peg was recovered in pieces. This gutter together with a similar one on the outer side of the radius lent itself nicely in forming a snug bed for a bone inlay taken from the tibia. The graft was held firmly in place by means of wires making a very fine reconstruction of what was a very bad situation (Fig 275). The wound healed nicely and now three months after the operation I present the result. The dorsal deformity has been corrected absolutely and the member is just as straight as it can be. The radial deformity has been largely corrected but not entirely so but it is about as well as it can be. The union is very firm and motion at the wrist is free and improving all the time. I expect much better motion than he has now as time goes on. He is now doing a lot of things with it. He is a farmer by occupation. He is unable to milk with it at present but milking is the finest exercise for this patient. Pronation is good but supination is somewhat limited as yet. This small swelling in the palmar surface is due to a little bit of callus and bone which you see in the x ray picture (Fig 275). That does not mean a deformity. That piece I did not take out at the time of operation. I left it in there to give strength. We have overcome the radial displacement and have overcome the dorsal deformity as you see. His grip is fairly good. Look at this unsightly deformity (Fig 273) with the peg away up in the medullary cavity a bad condition of affairs. Nothing could be done as long as that peg was in place. It was a foreign body and as such it unquestionably was the direct cause of non union. One

fixed in a groove on the lower fragment. This arrangement seemed to work very well at the time and held the fragments in good position. The wound healed without infection but to my great disappointment there seemed no inclination toward union. Week after week the wrist was anxiously examined but while



Fig. 23



Fig. 24

Fig. 23—Ununited fracture of radius showing great deformity and Kirschner wire slipped up in medullary cavity of upper fragment.

Fig. 24—Interposterior view does not reveal the extent of deformity. Note altered relation of lower end of radius and ulna. Kirschner wire is seen dimly.

the position at first remained correct the bones would not unite firmly. After wearing the splints two months the patient insisted upon their removal and a leather wrist support was worn. The man now began to work with the injured arm with the result that from month to month a deformity developed which was at first slight but after six months became very marked.

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thing that shows up nicely is a rarefying osteitis that you always find after two or three months or four or five months where there has been disuse of the limb. This condition corrects itself after the member begins to be used again. These bones



Fig 2 5



Fig 2 6

Fig 2 5—The lower wire includes a piece of radius loosened at time of operation. The longitudinal axis of the shaft has been restored. The outlines of the graft are clearly discernible.

Fig 2 6—Note how strongly the bone has been fortified by the inlay. The lower end of radius and ulna have resumed a more normal relative position. The wires have been removed. (Compare Fig 2 4.)

are all rarefied. The region of the wrist joint is rarefied, the calcium salts having been partially absorbed as a result of disuse. In such cases normal conditions of density are quickly restored when function is resumed. We have good bony union there now. There is good consolidation and his function is

90 per cent better than before the operation. Yes, it is all of that. I think his function is going to be 90 to 95 per cent, whereas the other way he was absolutely disabled.

Let me make a few remarks about Colles' fracture. In the first place, with reference to operating on Colles' fracture, where the cosmetic result is not as good as it might be, I should say, "Don't do it." I will never do it again in a similar case. We see Colles' fractures with atrocious results from a cosmetic standpoint, but with perfect function. Now, unless there is a very good and valid reason cosmetically or otherwise for operating I would not operate in such cases. The disability following a Colles fracture is not the result of bony displacement as much as the result of improper treatment. Too long immobilization with the fingers extended, that is to say, leaving the splints on too long, will give you more disability afterward than a fracture that is not treated at all. I do not know whether I make myself clear or not, but you can have a Colles fracture after six weeks still showing enormous radial and backward displacement, with perfect function. Why should we operate unless we do so for cosmetic reasons? Bear in mind it is a difficult job to correct a badly united Colles' fracture, and if you are wise you will let the patient alone if he has good function. My advice is not to touch it. That is my conviction. If you have such a case in a woman who absolutely wants the thing corrected, it is a different thing. Don't do it on account of impaired function because impaired function is not the result of malposition as we see the very worst malpositions with good function. We see fractures properly reduced cosmetically with terrible deformity of the hand and disability for months and months. Why? Because, in the first place, the doctor may have put on a plaster cast from the elbow to the finger tips and left it on a month or six weeks. If you want to produce a half year's disability, do that. Bad contracture and stiffening are the result which will take months of massage and passive motion to clear up. Keeping splints on too long and putting them on too tightly will do the same thing even after the most perfect reduction. The functional disability is a result of im

proper treatment, so that we know when a Colles fracture is properly reduced, ninety nine times out of a hundred it will stay reduced. With the application of anteroposterior splints, leaving the fingers free, so that muscular activity is not impeded, patients with these fractures will make uninterrupted cosmetic and functional recoveries.

Stiffness of the fingers following a Colles fracture is the result of a myositis, the result of pressure by splints or too long immobilization. An extreme condition of this kind is Volkmann's contracture or ischemic paralysis. This is the result of too tight bandaging and is a grave calamity to have happen. I don't believe that the general profession quite realizes this question, and that it may take only two, three, or four days of constriction to be followed by the most disastrous results. A fibrous degeneration of the forearm muscles takes place and the process does not stop until the hand is converted into an almost useless claw. It is only after tedious orthopedic treatment or operation that function is restored.

It is a mistake, in the next place to put in a foreign body such as ivory. I am getting away from that sort of thing. I will never use ivory again or any kind of foreign material in the medullary cavity of bone. I have done it time and again and I have generally regretted it. I have used ivory and *composition of one kind and another in the medullary cavity*, and I cannot say it is satisfactory. The use of metallic bodies, like the Lane plate, on the outer side of live bone in the treatment of fractures is bad enough as I will show you today, and we are getting away from that also. Such metallic devices are unnecessary evils and are fast being supplanted by autogenous bone-grafts. Don't put anything inside the medullary cavity of bone except it is an autogenous bone-graft or bone-inlay. This ivory peg was a foreign body. It did not serve its purpose. It prevented union, it slipped up in the medullary cavity, and *the member became more and more deformed every week* but it taught me the lesson not to put any foreign body in the medullary cavity unless it is a bone-graft or bone-inlay, as I have previously remarked. Those are the points I wish to

impress upon you in regard to this case I am getting more conservative all the time as regards operations on fractures. We have survived the furore which came with the Lane plate, and have learned by experience to demand that certain indications be fulfilled before advising operation. The first indication is that every other possible method of reduction has been tried and has failed to secure satisfactory reduction. A little displacement is of no moment when, in our experience, function will be restored. Aside from the danger of wound infection, one of the greatest drawbacks of the Lane plate and similar devices which hold the fragments immovable is delayed union. I always allow about one-third longer than the normal period for consolidation in Lane plate cases. I have seen many, all clean cases, in which firm union was delayed for many months until the plate was removed, whereupon, with use of the limb, consolidation rapidly occurred. An inlay, while it keeps the fragments in line does not hold them as immovably as a Lane plate, and for this reason does not interfere with union, which, as Lucas Championiere said long ago, requires a certain amount of motion to acquire firmness.

CASE II.—This man came so that I might show him and talk on the question of musculospiral paralysis, but I got started on this subject with the other case and may not be able to spend much time on him. In 1916 a year ago last December, this man was here with a spiral fracture of the shaft of the right humerus, with an immediate musculospiral paralysis. It is important to know, as I said before, whether a man develops paralysis immediately after injury or after the splint has been on two or three days or longer. This patient noticed it at once and so did the intern. The important question always to determine is, Was it immediate or secondary? It is of vast importance also from a medicolegal standpoint, as these cases may get into court the doctor's splints being blamed for the paralysis. The doctor might endure great embarrassment and a verdict for the plaintiff if he did not know whether the paralysis was there or not before he began treatment. You want to be in a position to say that this will or will not get well without

interference You want to be in a position to say if the paralysis is secondary or not and whether the patient under the use of electricity and massage and so on will after three or four months get better without an operation If you do not know whether the paralysis is primary or secondary you have nothing to base any opinion on and you cannot do the proper thing for the patient At any rate you are assuming an awful risk After a week I operated on this patient but this time I used a Parham Martin band I suppose you know what a Parham Martin band is I do not happen to have one here at this time It is a neat contrivance It is a metallic band which is carried around the bone and clamped holding the fragments very efficiently It is a very neat thing to use in spiral fractures You cannot use it in transverse fractures I will show you what it looks like in another case one of fracture of the tibia This band was put on in this case and the after treatment was uneventful Here again it is interesting to notice how long it takes for recovery The nerve was not completely severed in this case but had to be sutured It never would have gotten well without operation The treatment of the bone is secondary to that of the nerve I should have treated the bone conservatively if it were not for the nerve injury

I believe that all fractures of the humerus associated with immediate musculospiral paralysis should be operated on It took eight months before this man had complete use of the hand It takes eight or nine months or a year before function is completely restored The neurones or axis-cylinders grow out from the proximal portion of the old nerve until they reach the periphery Can we have a contusion of the nerve that will cause paralysis? Yes I have had such cases and I have cut down on the nerve in a few instances What is the object of waiting weeks or months for improvement? You get much better results in both the fracture and the nerve by operating and killing two birds with one stone I would rather cut down early and find the nerve only contused than wait for improvement in vain and have to do a late operation anyway After you have made up your mind that you have to operate I would

do so right away if I have the indication. The paralysis is due to external violence applied at the time of injury, bones are broken and separated, and the nerve is closely associated with the bone as it passes around in the musculospiral groove.

QUESTION How do you splint a Colles fracture?

DR. HESSERT The main thing is *reduction*. After you have reduced a Colles fracture, some go so far as not to put on any splint at all. I would not do that. If the fracture is properly reduced, I personally would treat it with anteroposterior wooden splints running the posterior splint from the head of the radius to the metacarpal phalangeal junction, and the anterior one sufficiently short, giving the patient free motion of the thumb and fingers. I keep the splints on, all told, for two or three weeks, not over three, taking them off in the meantime half a dozen times in order to keep up passive motion and massage. You must pad the splints with sheet cotton sufficiently, strap each one on individually with adhesive plaster, and do not employ too much pressure. The splints should not cause pain. For the first four or five days examine the arm daily. Motion of the fingers should be free and not painful.

CASE III.—This boy has an interesting history. He was under my care seven years ago with acute osteomyelitis. A complete history of this case together with x ray pictures also a description of an arthroplasty, has already appeared in the *Surgical Clinics*¹ so I will not go into very much detail regarding his case.

He had acute osteomyelitis of the tibia in 1910, resulting in the loss of the entire diaphysis of the bone, which became necrotic, and was removed. Here is a picture of the shaft after it was taken out. I have treated these cases of acute osteomyelitis side by side, taking out the shaft in one case, and leaving it in in the other. I will say that those treated conservatively while taking longer to recover, presented quite as good end results as those in which the whole or part of the shaft had been removed. There was complete regeneration and everything went along nicely. The only trouble we had here

¹ *Surgical Clinics of Chicago* February 1918 p. 129

was one of those rare complications, involvement of the joint in acute osteomyelitis. In the great majority of cases of osteomyelitis, of the shaft of the tibia we will say, the knee-joint is not involved, but it was involved here. The infection spread to and around the joint, and to make a long story short it left this boy with an absolute bony ankylosis of the left knee at an angle about like this (indicating), so that he was walking in that way at an angle of 120 degrees, absolutely stiff and rigid, as is shown in these pictures, which give you an anterior and lateral view. I was determined to do something for the boy, as he was incapacitated physically. I planned an arthroplasty, hoping to get more or less motion in that knee-joint. An arthroplasty of the knee is about as difficult a job as one can tackle in the whole domain of surgery. It is one of the toughest propositions imaginable—I mean where there is complete bony ankylosis. The hip- or elbow joint is not in it with the knee. If any one does much of this kind of surgical work it will drive him to an early grave.

In the first place, you see by the pictures that he had absolute bony ankylosis. I will describe briefly what was done. I cut down on either side longitudinally, loosened up the flaps, loosened up the patella, made two flaps with the convexity upward, reshaped the ends of the bones, the femur and the end of the tibia. I made two depressions in the tibia for the newly formed condyles of the femur and turned the patella completely around. Not having put on a constrictor, there was a great deal of bleeding, but not enough to obscure the different steps of the operation. The operation took a little over two hours to perform. When the flaps were brought over the tibia they overlapped for quite a distance. When I was through with the operation I could move the knee very well to a right angle. I could straighten it easily and bend it to a right angle. It was drained, and healing by primary union took place. Some time after he left the hospital he developed a small abscess under the skin which had nothing to do with the knee joint. The difficult proposition here was to make a joint not only approximately normal but to *make it weight-bearing* keeping the leg

in line I leave it to your judgment to say how much this boy has been benefited. He is satisfied with the result because he can walk freely, without support, with his leg straight. The plastic operation was done on July 19, 1917. You will notice that there is no lateral instability. There is no wobbling. The joint is weight bearing, which is one of the conditions we strive for. I am satisfied with the condition. I am not quite satisfied with the mobility, but I am glad to hear that Dr. Ridlon, who is present this afternoon, considers it a good result. I would like the boy to get more motion and I think he will as time goes on. Is it not remarkable that, although we destroyed the lateral and crucial ligaments, the knee does not wobble laterally? This is due to keeping the axis of the leg straight—keeping the limb plumb. It is almost as firm as the other leg. I will show you x-ray pictures that were taken a month or two after the operation—I think about six weeks—showing the way in which the tibia was shaped and fashioned to accommodate the condyles of the femur. Here you see a lateral view. I was afraid of this region for various reasons, in fact I did not sleep that night, and I will tell you why. I did not know the condition of the external popliteal nerve, and I did not know whether the boy was going to develop gangrene of the leg or not. When I saw the boy the next day and felt of his toes they were nice and warm. Motion was there, and a big load was taken off of my mind. The external popliteal nerve had been exposed and I felt sure I had not injured it, but we can never tell. We should be afraid of the circulation for the simple reason that here was a limb which was in a bent condition for years, and you never can tell what will happen when you straighten it. If I had cut the external popliteal nerve the patient would have been worse off than before. If we had impaired circulation it might have meant amputation. You see how important it is, and I think Dr. Ridlon will bear me out in saying that when a surgeon operates on an ankylosed knee joint he will not be able to sleep that night nor rest until he sees the patient the next morning. The result in this case conforms to the requirements

of arthroplasty of the knee inasmuch as it is weight-bearing. The shoulder and elbow do not have to be weight-bearing. The knee must be weight bearing to be a good job. If one cannot bear weight on the knee afterward, in spite of free motion, what good is it? It is better stiff. I have known surgeons to stiffen them again after arthroplasties to enable these patients to walk.

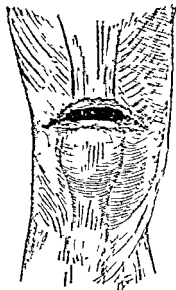


Fig. 277

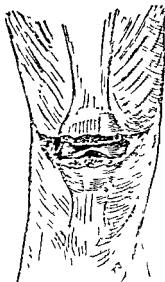


Fig. 278

Fig. 277—Rupture of the quadriceps above the patella.

Fig. 278—Transverse fracture of the patella with lateral laceration of the capsule and sponerosis of quadriceps extensor

CASE IV—The next patient illustrates a condition that forms one of the types of injury of the extensor apparatus of the knee-joint. I believe in classifying injuries in the neighborhood of the knee-joint not into fractures of the patella, or to put fractures of the patella in the foreground, but to consider the whole mechanism. In the first place, we may get an avulsion or separation of the extensor tendon above the patella. I

have had cases of this type here, with tearing off of the quadriceps extensor tendon, leaving the patella intact (Fig 277). There is a transverse laceration above the patella absolutely disabling the patient. The crucial test in such a case is this: The patient lying in bed, with leg extended is not able to lift the leg off the bed in the extended position with any of these injuries, unless it is a fracture of the patella without any injury



Fig 279—Longitudinal fracture of the patella. The longitudinal light streak between the arrows is the fracture.

of the lateral aponeurosis. A suprapatellar laceration of the extensor tendon is a very serious disabling injury which cannot be treated conservatively. It requires accurate suturing. Next we have the most common injury in this region—the so-called fracture of the patella (Fig 278). Fracture of this sesamoid bone called the patella is as a rule the least part of the general injury. A simple transverse fracture of the patella without any

laceration of the lateral capsule the fascia and lateral extension of the quadriceps tendon is not a severe disabling injury and can be treated conservatively because the extensor apparatus is not impaired. You can get along without a patella. The patella has been removed for tuberculosis and other conditions and the functional result has been good so that if the fascial



Fig. 280

Fig. 280 Longitudinal fracture of the patella.

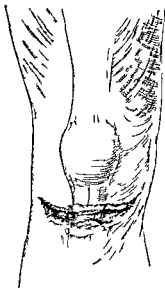


Fig. 281

Fig. 281 A view of the ligamentum patellae. The ligament usually carries with it a small bit of bone. The lateral laceration is an extent but are usual extension on both sides.

apparatus is intact the mere fact of the patella being fractured is not such an awfully important thing.

I will show you in this connection a longitudinal fracture of the patella (Figs. 279 and 280). Speaking of fractures of the patella in the majority of cases they are transverse. Rarely we get a longitudinal fracture of the patella. I have an x-ray

picture of such a case which was caused by direct violence. There was no functional disability. The patient was able to lift the leg off the table and got well without operation. But those are rare cases. The important thing about the so called fracture of the patella is the lateral laceration of the capsule and in an operation for fracture of the patella the important thing is to repair this lateral laceration much more so than to repair the patella itself. Before the days of aseptic surgery it was customary to throw a ligature or suture around the patella subcutaneously and not consider the lateral laceration as very important.

Finally we come to this case which is an avulsion of the ligamentum patellæ from the tibial tubercle (Figs 281 and 282). I have asked this man what he was doing at the time he was hurt. He said he slipped and fell and in an endeavor to save himself enormous muscular strain was applied with the patella as a fulcrum. If it does not break the patella or the tissues do not tear off above the patella it may give way below as it did in this case. He came in with an enormous hematoma involving the knee joint. He was unable to raise the leg off the bed. The patella was not fractured but I could palpate the separation of the tissues below the patella. As operation is the only proper treatment this was done. Sometimes I turn a flap up and sometimes I turn it down. In some cases where the convexity of the flap was upward we have had a little necrosis of the edge of the flap so that in the majority of cases I have the convexity of the flap downward. There is no objection to the scar being in front of the knee at least I have never found any. The flap is turned back and the proposition to deal with is one of fixing the ligamentum patellæ to the bone. The lateral capsule was torn extensively in this case. It is easy enough to sew up the capsule but how can you fasten the ligament? The ligament cannot be sutured to the bone the only thing to do is to nail it and that is what we did here with a couple of wire nails. These little shadows you see in the x ray picture represent little spicules of bone torn off from the tibia (Fig 282). That is a lateral view. I now show you an

anterior view The patient was operated on August 23 1917 I have asked him what he can do with that knee and whether he can walk upstairs without taking one step at a time and he says he can The result here has been very good and it typifies one of three main accidents that involve the extensor apparatus avulsion of the ligamentum patellæ When these

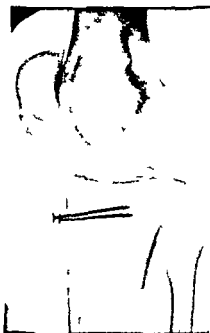


Fig 282 —Avulsion of the ligamentum patellæ Ligament nailed to tibia

tendons tear off they tear off a small portion of the bone on the order of a sprain fracture The postoperative treatment of all of these cases is the same After ten days or two weeks immobilization the leg is kept in a posterior splint which is removed every day or two for the purpose of making passive motion and massage The patient walks on the leg after the third week and from this time on an elastic support is worn

and moderate active and passive motion indulged in. It is a great mistake to immobilize too long say six or eight weeks. This prolongs the disability for months and some of these patients never regain as free motion as they would with the other system. Passive motion should always be gentle. Rough treatment does more harm than good.

CASE V—Here is a patient who was injured October 31 1917 and his case brings up a number of points in the treatment of fractures of the leg. He comes in with a spiral fracture of the tibia (Figs 283 and 284). He was hurt in carrying in a bag of coal. He slipped fell and twisted the leg right around. In such a case as this always take two views. That may be an elementary thing to bring up before a body of gentlemen like yourselves but if anybody asks you to give your opinion in such a case with only one plate don't give it. You want two views always of every fracture unless it is a fracture of the hip or a fracture of the skull. But in a fracture of one of the extremities don't base an opinion on one view only. You must have two views. I have been very much puzzled at times by having only one view. One would think that the bones were in ideal apposition until he sees the other view taken at right angles. You can fool a jury or anybody with that picture of this leg (Fig 284). As I have said this may seem to you an elementary point but I urge you not to base your opinion on one view alone as you will get yourselves into trouble if you do.

We did here what we always do with these cases. The patient was put on a Hawley table extension applied and while extension was on and the man was asleep a cast was put on. We did this with this spiral fracture and you know we have right handed spirals and left handed spirals. If a man jumps off a car and turns in this manner to the right (illustrating) it is a right handed spiral and the other one is a left handed spiral. You can tell from the character of the fracture how this man was hurt more or less. After the man had been anesthetized with the limb extended an attempt at reduction was made and that was the result (Fig 285). It cannot stay like that. We have tried conservative means and have been unsuccessful. So

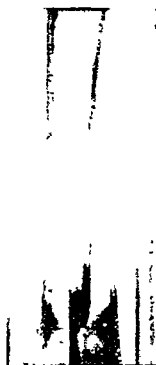


Fig. 283

Fig. 283—Spiral fracture of tibia. Radiogram taken through cast after attempt at reduction under anesthetic and use of Hare's table. The fragments, owing to their oblique line of contact, are prone to slide by one another producing a longitudinal and lateral displacement. The sharp ends are very apt to be speared into the soft part. This is a type of fracture that commonly requires open reduction.



Fig. 284

Fig. 284—Lateral view, while it shows the axis of limb to be correct, gives no evidence whatever regarding the type of fracture or the amount of displacement. Exemplifies the necessity of two views.

in a case like this we advise the patient to submit to operation, and when it comes to operating on fractures of the leg I will show you one case later where I used an inlay. You can get



Fig. 285



Fig. 286

Fig. 285—Fixation with Lane plate. Approximation is not perfect, there is still a slight displacement. The plate is heavier than necessary but happened to be the only one available.

Fig. 286—Lateral view.

the most accurate mechanical results with a Lane plate but I do not like it better than an inlay. The plate is much quicker of application. I will show you another patient on whom I

did an inlay. There is the least bit of displacement here (Fig 286) and the result is not what you call ideal. I am not showing him on that account but on account of what followed later. I refer to delayed union. That is something we have to reckon with in our Lane plate operations. This wound healed by primary union and things went along very nicely for about three months. The cast was on for two months and union then seemed firm. After three months however the plate was still in place but the thing wobbled. I took out the plate under local anesthesia, it had to come out because the union was not firm. I put the leg in a plaster corset and let him walk on it. I believe Lane insists that if we do not get union in these cases it is due to infection. But it is not infection. This case healed up clean from beginning to end yet we have delayed union but as soon as weight bearing function is established and the foreign body is out the union becomes firm. It is firm enough now. I am allowing the man to walk around and union is going to be absolutely firm. There is one of the drawbacks of the Lane plate or any other device that holds the bones immovably. I don't care very much about the bone plate. A great deal has been said about the benefits of the bone plate owing to its being absorbable but it has all the faults of the Lane plate in that there is danger of infection and absorbability to my mind does not count for very much. I do not know how you gentlemen feel about it. The principle is the same. If the Lane plate is bad the bone plate is bad. The bone-plate is much harder to put in and you cannot do as nice a job with a thick bone plate as you can with the Lane plate. If you decide to use foreign material in these cases use metal. The nicest thing in cases of this kind is an inlay but with an inlay you cannot get as accurate apposition in oblique fractures as you can in transverse. You can get good coaptation for all practical purposes and you get better union than with the Lane plates and I have been using Lane plates ever since they came out. The more experience I have the more conservative I become. I will try everything first before I operate. We have been carried along the crest of the wave of

popularity of the Lane plate and much harm has been done by its use. Operations have been performed by men who are not qualified and patients are walking around with deformities and sinuses who never should have been operated by men incompetent to do the operation. It happens once or twice a year

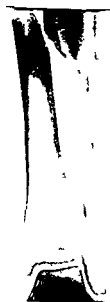


Fig. 287



Fig. 288



Fig. 289

Fig. 287. Spiral fracture of the tibia and oblique fracture of the fibula. Considerable overriding and lateral displacement. Irreducible. Some deformity persisted after attempts at reduction.

Fig. 288.—Same as Fig. 287 after reduction and application of Parham Martin band. Perfect reduction.

Fig. 289.—After infection and removal of band two months later. Displacement has recurred. The sharp ends of the bones are becoming necrotic.

that we have trouble here with such cases. Speaking of infection I will show you what happens. During the time I operated on the man whose pictures I will show you there was a change in the intern and operating room service and it seemed as though almost every case I operated on that week became

infected yet I felt it was not my fault. Other men had infections. What happens to these operative cases when they become infected?

CASE VI—Here is a case of spiral fracture of the tibia (Fig. 287). We did the same thing in his case as we did in the previous one. We had an x ray taken with the patient on a Hawley table under an anesthetic. Here is the next picture showing the result after operation (Fig. 288). Everything went along beautifully, the Parham Martin band is in place and the result is absolutely ideal. After a week infection supervened and after a couple of weeks the Parham Martin band had to come out (Fig. 289). The whole thing opened up and started that long and tedious course of osteomyelitis and necrosis and sequestration now going on for over a year (Figs. 289 and 290). He was hurt nearly a year ago. He has a leg corset on, he walks fairly well and has very little deformity. He has a few sinuses but the end result is quite good. But think of the disability for a whole year. Think of what that means economically and to the insurance company that is paying his weekly indemnity. Think of what infection means. You see after a couple of months sequestra are coming away (Fig. 290). This end of the tibia got loose and was pulled out. We kept pulling bones out for months and months but the thing to remember is that eventually with good care these cases turn out pretty well if they receive intelligent care in spite of osteomyelitis. But the interesting feature is the ultimate result. This picture shows the condition when most of the sequestra are out (Fig. 291). He has no motion at the seat of fracture, he has good firm union although it is partly fibrous. He walks around, he uses a leather leg corset and is doing very well but think of the long disability. We should not undertake bone operations lightly ever and never if we have not the proper indications for operative interference and these indications are the inability by conservative means to properly coaptate the fragments. If the fragments are not properly coapted it may leave functional disability.

Fractures in the x ray picture always look worse than they

are in reality. The x-ray picture is only a shadow, and I have cut down on fractures and found they were not as badly displaced as I thought they were from the looks of the picture. In these operative cases we strive to get both a good cosmetic



Fig. 290



Fig. 291

Fig. 290—The sequestra have been removed—infection has been checked and union is taking place. Light months after injury. The fibula has united firmly.

Fig. 291—Ten months after injury. A small sinus remains. There must still be one small sequestrum. Union is quite firm and the axis of limb is preserved. Patient has been using leg for some months wearing a leg corset. This weight bearing favors union and repair.

and functional result. Considering the great degree of infection and sequestration, the ultimate result in this case is very good.

CASE VII—This man was injured February 2, 1918. It is another case of spiral fracture of the tibia and fibula (Fig. 292). These fractures are almost impossible of reduction, but that

does not mean that all these fractures have to be operated on not by any means. You can get a very good functional result without operation in many instances by extension and manipulation even if there is lateral deviation. I was taught a lesson a number of years ago in a case of this kind and it helped to dampen my ardor relative to the operative treatment in frac-



Fig. 297



Fig. 298

Fig. 297—Spiral fracture of the tibia and blue fracture of the fibula. Fracture by torsional violence.

Fig. 298—Spiral fracture after attempt at reduction on Hawley table. It is obvious why bones will hide by a common traction device.

tures of this kind. On a trip to Alaska one of my fellow passengers slipped and fell sustaining a fracture of the leg. I put him in a blanket splint and brought him from Skagway to Seattle where he was taken to the Swedish Hospital. x-ray pictures were taken and it was found that he had a spiral fracture of the tibia with moderate deformity. If I had had that man in

Chicago I undoubtedly would have operated on him but being in a strange city and in a strange hospital I put him to sleep put on a plaster cast and brought him home. He showed less deformity than this case (Fig 293) as there was $\frac{1}{2}$ inch lateral deviation. He got good union and a splendid functional result. If an x-ray picture were taken now we would find a lateral deviation of $\frac{1}{2}$ inch but his leg is no shorter apparently. He is pleased with the result. What surgeon has not at one time or another advised operative correction of a fracture which the patient refused to submit to and then have the case turn out very satisfactorily under conservative treatment? Those are the jolts that do you good.

Here was a spiral fracture of the tibia. This picture was taken February 3d and the other one was taken February 8th. There is the difficulty in this case. The patient comes in with the same kind of a spiral fracture as the previous cases. The most elaborate care is taken he is put on a Hawley table the leg extended a cast put on but if anything the limb is worse than it was before (Fig 293). In this fracture this (indicating) acts as an inclined plane and these bones slide by. You cannot keep them in place. An operation was proposed here and the patient consented. I used here the Hoglund saw which works nicely. While the inlay operation is not difficult to do it takes a longer time than the insertion of a Lane plate. This is an anteroposterior view (Fig 294) but it shows the ends of the inlay extending down to the point I show you and the wires holding it in place. I will show you the other view (Fig 295). With a Parham band or Lane plate you can get more accurate coaptation in an oblique fracture than you can with an inlay. This shows what I mean here. In spite of everything fitting all right you cannot prevent this from sliding down a little bit in the inlay. It is only a little over a month since the operation was done and the patient has still his cast on. The stitches are out and the wound is clean. I made a large semilunar flap turned it to the inner side so that afterward the sutures would not lie directly above the operation on the bone. If you get a stitch abscess over to the side it is not

likely to be followed by any serious results. This has been on about a month and I will leave it on for probably another three weeks, then it will be taken off and if necessary, I will put on a leg corset and get the patient on his feet as soon as possible bearing weight on the limb. That is a point I think

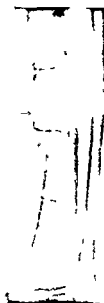


Fig. 294

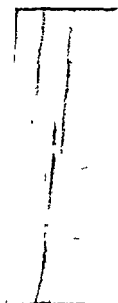


Fig. 295

Fig. 294—After inlay operation there is still a slight amount of lateral displacement. Inlay shows in dotted outline. Arrow shows where the two fragments of inlay are in contact.

Fig. 295—Side view of Fig. 294. On the whole the approximation is very good. The upper wire has broken but graft is intact.

that is oftentimes overlooked in cases of malunion or delayed union. The putting on of Lane plates for non union is absolutely reprehensible. It is out of date, it is no good at all. A Lane plate is out of place in non union. The natural thing for non union is an inlay. For malunion the best thing is to get the patient on his feet with a leg corset and union becomes firm

in a short time as a rule. The plaster cast extends from the malleoli to the tuberosities of the tibia allows free motion of the ankle and knee. I am a great believer in that.

I showed you a moment ago a rarefying osteitis that occurs from disuse. At the seat of fracture there is a rarefying osteitis. If you have delayed union put on a cast and keep the fragments from becoming bent and buckled but let the patient walk and you will get union.

There is one thing we have given internally with good results and that is thyroid extract. In the very first Albee injury I made a few years ago I failed to fasten the inlay sufficiently. I hammered it in. It was a case of transverse fracture with non union and that inlay did not stay in place. It moved and it became absorbed and the man had non union almost the same afterward as he did before the inlay was put in. Aside from using a leg corset I put him on thyroid tablets 5 grains three times daily for six weeks and I believe it had a good deal to do with the solidification of the fracture. I mention that to you for what it is worth but it is more or less empiric.

CASE VIII—Fracture of the Os Calcis—Here is a type of fracture that I believe is important to you military men from the standpoint of prognosis and treatment. This man was cleaning windows lost his balance fell and landed with one foot on the cement and one foot on the grass. The foot that landed on the cement was injured the patient sustaining a fracture of the os calcis (Fig. 296). The fracture here through the narrow neck of the os calcis is the most frequent seat of fracture. We get fractures in all directions some in which a small oblique piece of bone has been broken off and pulled up by means of the tendo achillis some are impacted and some are not impacted. The question of treatment and prognosis is very important. As to treatment the question is whether in the first place to treat it conservatively as I did here or to make traction by getting behind the tendo achillis with some instrument pulling down nailing it with a spike or driving in a bone peg. I have some pictures of spikes and nails. Spikes and nails are not worth much as a rule because they are foreign material.

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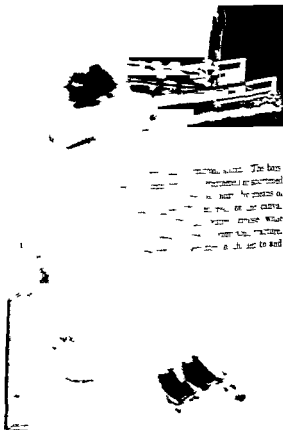


Fig. 296—Fracture of the os calcis w

believe operation would get us a better result
to get now and I did nothing except to put the
and flexion

Fractures of the os calcis are prone to result in
of disability. Some of them never get well. Some
tients will complain of pain and disability for years a
and it is important to know that when it comes to ma
report for an insurance company or a corporation because

want to know how long the man is entitled to disability. Some of these patients are left permanently disabled. Fractures of this type of which I have had quite a number have done very well under conservative treatment. I do not like cutting down on them and pegging the fracture unless the deformity is great. I did nothing in this case except to put on a cast. It is important to give the man time enough afterward for union. I will not allow him to put any weight on that foot for three or four months. Then he should wear some kind of support to prevent the arch from breaking down. I would like to hear an expression of opinion from Dr. Ridlon in regard to this case.

DR. RIDLON. In a fracture of this type I should have molded the foot in as good shape as possible with the cast and wait for the man to get well and if he has good function without doing anything else I would let it go at that. If I could trim off some of the outside fragments, some callus which is restricting motion afterward I would do that. That is all I would do.

DR. HESSERT (resuming). That is the way I feel about it. In a case of this kind I agree absolutely with Dr. Ridlon that we should be as conservative as possible if there is fair approximation, believing that function will be fairly good. Of course it may not be as good as it was before. We get lots of cases of fractures in firemen and workmen who fall from ladders or scaffolds and there are other elements to be considered than those of an operative nature. As a rule men with fractures of the os calcis have a long period of disability.

CASE IX.—This man whom you see in bed is seventy six years of age. He sustained one of the worst comminuted fractures of the neck and trochanters of the femur that I have ever seen (Fig. 297). He fell on the sidewalk and sustained this severe injury. This is a very simple double inclined plane which you see in use here and one we have used for a very long time (Fig. 298). What does it do? With it you get flexion of the hip, you can get abduction of the thigh and flexion of the knee and extension. Of course we have different kinds of boxes. We have some that are adjustable allowing the knee to be raised and further flexed. This apparatus answers very well in

I have spiked a hip-joint for non union but the spikes came out and the hip was worse than it was before. That does not happen with an inlay or graft. You can reduce these fragments if there is much deformity and drive in a bone-peg. If necessary, you can first tenotomize the tendo achillis. My judgment was that this fracture was impacted. The foot did not look flat nor did the radiogram show much deformity so it was my judgment that I should not do anything radical. I do not



FIG. 96.—Fracture of the os calcis with impaction

believe operation would get us a better result than he is going to get now and I did nothing except to put the foot in inversion and flexion.

Fractures of the os calcis are prone to result in a long period of disability. Some of them never get well. Some of the patients will complain of pain and disability for years and years and it is important to know that when it comes to making a report for an insurance company or a corporation because they

want to know how long the man is entitled to disability. Some of these patients are left permanently disabled. Fractures of this type of which I have had quite a number have done very well under conservative treatment. I do not like cutting down on them and pegging the fracture unless the deformity is great. I did nothing in this case except to put on a cast. It is important to give the man time enough afterward for union. I will not allow him to put any weight on that foot for three or four months. Then he should wear some kind of support to prevent the arch from breaking down. I would like to hear an expression of opinion from Dr. Ridlon in regard to this case.

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this kind of fracture This man has now 12 pounds of extension We get splendid results from this apparatus As a rule we don't use it in fractures of the hip For such fractures I like the Whitman position Take this individual case We



FIG. 79.—Comminuted intertrochanteric fracture of the femur in an old man. Note calcified femoral artery. There is some spurring of the rim of the acetabulum the result of an old arthritis.

have a little abduction we have flexion and we have perfect extension It works all the time day and night and I think it is a very fine method of treating fractures of the femur With it you can treat fractures of the neck of the femur you can treat subtrochanteric fractures because there is an indication for flex

ion in treatment in fractures of the upper end, for in those fractures of the upper end the fragment is pulled upward. You get flexion and abduction. You can accommodate the lower fragment to the upper one by flexion, abduction, and extension. This apparatus gives you your extension and flexion. We have some at a greater angle, some that are adjustable, and the results are very fine. Some of the cases of fracture of the shaft that can be treated conservatively do not require flexion at the

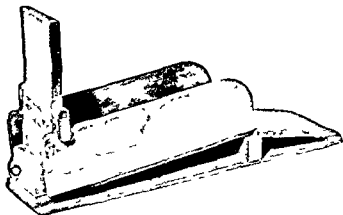


Fig. 298.—Double inclined plane—old wooden model. The leg is placed in the box and the foot held in position by means of lateral strips of adhesive plaster similar to Buck's extension. The whole apparatus is then placed on a board extending over the foot of the bed, inclined at any desirable elevation, and the weight card is tied to the eyelet on box. Rollers are placed under the box to lessen friction. This outfit is crude, but very serviceable.

hip or knee. You can treat them with simple extension. A transverse fracture of the shaft of the femur to me means operation. I would like to see some one treat conservatively a transverse fracture and get the fragments in apposition, I have never been able to do it with satisfaction. In oblique fractures I would use the external Hamilton splint and Buck's extension. As I have said, transverse fracture means operation in ninety-nine cases out of a hundred, and we operate on them with good



Fig. 299—An improved double inclined plane or railroad splint. The bars which slide on rollers can be fixed at any angle and can be lengthened or shortened by reason of telescoping rods. The foot is held to the foot board by means of wide laterally applied strips of adhesive plaster. The leg rests on the canvas strips which can be padded with cotton or felt. The leg is entirely exposed while traction is maintained and accessible to dressing in case of compound fracture. This splint will answer for all fractures from the lower third of the leg to and including the hip-joint.



Fig. 300—The standard supporting the distal end has been brought down, and the splint can be further elevated by loosening the screw and pulling out the rods. The traction card is tied to the eyelet at base of foot board and carried over the pulley. This apparatus fills all indication where flexion of the hip and knee are required with traction. The knee can be bent to any desirable angle. The apparatus is very stable and there is a minimum of friction thus lessening the relative pull on the adhesive plaster. Twenty pounds exerts a strong traction.

results. This man has been in bed two weeks. He feels comfortable. We will keep him in this apparatus until we get some union depending on conditions which may be six or eight weeks. He will not be able to use that leg provided we



Fig. 301

Fig. 301—Anteroposterior view of spiral fracture of femur. Note calcified femoral artery. This is the position before applying extension.

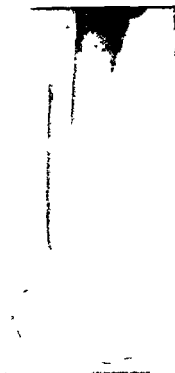


Fig. 302

Fig. 302—Spiral fracture of lower end of femur. There is about one inch shortening which was corrected by extension.

get union for three or four months. As soon as we get sufficient solidification we can get him up in a plaster cast. There is always danger of hypostatic pneumonia in these cases and if he should develop signs of pneumonia it will be necessary to change the treatment entirely and get him up.

CASE X—This man is sixty four years of age. He sustained a spiral fracture of the femur at the junction of the lower with the middle third (Figs 301 and 302). This case calls for extension and flexion of the knee. He is in a double inclined plane with flexion at the hip and flexion of the knee, with the necessary amount of extension. He has 15 pounds on for extension. The heel is kept free from the underlying surface. Lateral strips of plaster are carried around the foot of the ap-



Fig. 93.—Ununited fracture of neck of femur—two years standing. Some absorption of neck. Great pain and disability. The distal fragment is resting against the rim of the acetabulum. There is $1\frac{1}{2}$ inches shortening.

paratus and the traction is made partly on the box and partly on the leg (see Fig. 298). The adhesive plaster is carried over the line of his fracture. This contrivance is one that any carpenter can make for you or you can make it yourself.

CASE XI—This man is forty years of age. He fell off a ladder, striking on his hip and sustained a fracture of the neck of the right femur. He was greatly disabled. He went on untreated for two years, during which time he suffered great

pain. He was so disabled that he could not work. He felt miserable. I will show you an x ray showing the fracture (Fig. 303). As a last resort he came here and we were determined to do an open operation. I made an anterior incision and an outer incision cut down on the joint and much to my surprise after two years there was no union. I was not able to demonstrate that before operation owing probably to the great muscular rigidity and even the x ray picture did not



Fig. 304.—Bone peg from tibia driven into head of femur. Peg projects slightly beyond head of bone. Position of head and shaft is more nearly normal than in previous view. Shortening corrected to $\frac{1}{2}$ inch.

enlighten me on that. When he was asleep I saw there was motion at the point of fracture. We dragged the limb over, extended it, abducted it, and put in a bone peg. There was no union and there was motion at the seat of fracture. There is considerable absorption of the neck. I abducted it some, then took a graft from the tibia and drove it in here. We took the cast off after eight weeks to look at it, and it is in perfect condition. He has now about $\frac{1}{2}$ inch shortening. He had $1\frac{1}{2}$

inches before operation. Having immobilized the fracture, it relieved pain and will restore his function. So far the result has been very satisfactory (Fig. 304).

CASE XII—Here is an x-ray picture of an impacted fracture of the neck of the femur that raises the question of the advisability of breaking up such fractures (Fig. 305). I do not know whether I can take a dogmatic stand on that or not, as sometimes I am in doubt whether to break them up or not. I

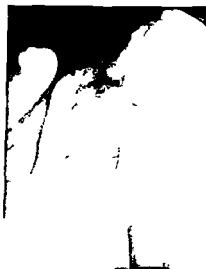


Fig. 305—Case of impacted fracture of the neck of the femur. Position very fair—no much deformity or shortening. Very little eversion of foot.

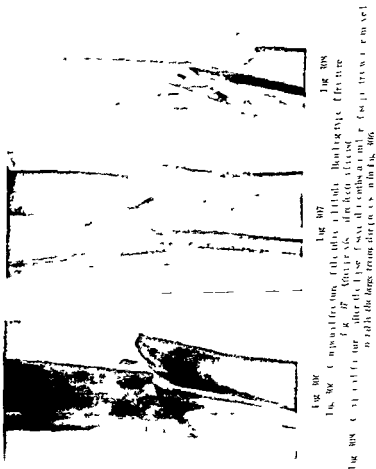
will say this, however, it is not the easiest thing to break them up unless you use brute force and possibly cause some further injury. If there is not too much eversion, if there is not too much shortening, I would let that man go, taking into account the age of the patient and his general condition. In other words, if there is little eversion and not too much shortening, I would let the man alone as I did here. It was the proper thing to do because I believe the result we got here with only about

$\frac{1}{2}$ inch shortening is very good. I took his cast off the other day and the result is not much worse than you would get by another method. I would not operate on a patient with a fracture of this kind. I believe in a case of impacted fracture if the position is good and there is not too much eversion (there is bound to be some) and there is not too much shortening I would let him alone. That is the way I have been treating these cases here at this hospital and I am getting probably as good results as anybody else with fractures of the neck of the femur. I see a lot of cases that are treated elsewhere with no better results than ours. I did not put on any extension as it was not required. I put him in a body cast. He has been up and around because I took the cast off the other day. It is about six weeks since he was here. Even if a fracture is impacted it does not necessarily mean that it cannot loosen up afterward and result in more deformity if the man gets up and puts weight on the leg too soon. You have doubtless heard of Cotton's treatment of hip fractures by impaction. He has had splendid results in that way. I have seen patients in whom he has demonstrated beautiful results. I have seen results just as good from other methods. I do not know whether I agree with him as to the advisability of this line of treatment. If it is not the best thing to do under all circumstances let it alone. Treat the case conservatively, put the patient in a cast and keep him up and around.

CASE VIII—This old man was brought here October 3, 1917 with a compound comminuted fracture of the tibia and fibula. This fracture box shows you how you can get all the flexion you want (see Fig. 798). If you want acute flexion you can get it. You can make such an apparatus as this yourself or you can have a carpenter make it for you in a short time and it is sufficient. I have been connected with this hospital for ten years and during that time I have used this apparatus a great deal. I do not use it in every case but there are certain cases where it comes in very handy and can be used to great advantage.

In compound fractures we first treat the infection and secondly the bone. If necessary we open it up widely, get the

freest possible drainage as long as necessary, or until such time as we can deal with the bone itself. Primary operations on the bone are not indicated. I would get the bones together as



well as possible primarily and later on get better reduction but treat the wound as a wound first of all. That is what we did here.

As a rule, you can tell from the picture in what direction the

force was applied in producing a fracture. The force was applied from this side (indicating). The tissues started to break or separate at the point I show you and one line of the

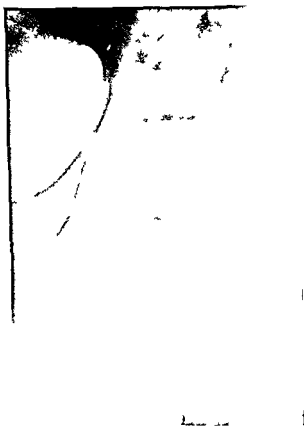


Fig. 309—Fracture of the neck of femur of six weeks standing. No union. Not impacted. Shortening could not be determined as the leg was already short the result of a previous accident.

fracture ran up like this (indicating—Fig. 306) and another in that direction and oftentimes this triangular piece is loose in there. This patient was treated this way and this picture gives us a side view. He had a certain amount of necrosis and se-

quadrature but no infection in the strict sense of the word. The picture shows a perfect reduction taken through the cast (Fig. 307) and you can see the bones are perfectly lined up. The other view shows reduction of the bones to keep the line itself preserved, and it is a good result. Some of these loose

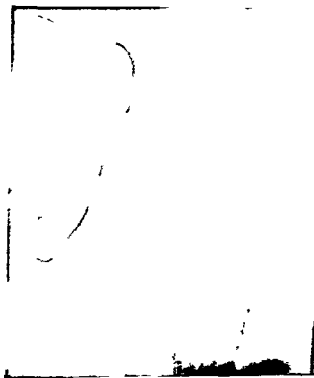


FIG. 310.—Condition soon after operation. Bone perfectly aligned with head of femur but a small piece was needed.

fragments came out in time. This picture was taken January 1st (Fig. 308). In the meantime some of these fragments either came out themselves or were removed. There is one piece still in there and it is evidently going to stay. After the wound had healed up and the bones were fairly united I put a

leg corset on him and allowed him to walk around and took it off some time ago. The old gentleman is going to have a good result even though the bones are not in good apposition cosmetically.

I do not use Lane plates in compound fractures except once in a very great while. In compound fractures in which the



Fig 311—Anterior view of Pott's fracture. Fracture of fibula somewhat indistinct. Astragalus is slightly displaced outward. Note the interval between astragalus and internal malleolus.

soft parts are very extensively lacerated and the bones extensively exposed—that is the only place where I would put on a Lane plate and then take it off later. As a general proposition however I do not advise any fixation apparatus or internal splinting of compound fractures.

CASE XIV—Here is another hip case. The patient is a railroad man by occupation. He fell down and fractured his hip (Fig. 309). He was at home for six weeks without treatment, and I saw him at the house, diagnosed a fracture of the hip and sent him to this hospital. Whether my judgment is correct or not in what is to follow I will leave to you. I deter



Fig. 312—Lateral view of Pott's fracture showing plainly the fracture of the tibia

mined that if at the end of six weeks there was no union the best thing I could do would be to drive a bone peg in there which I did very soon after he came in and I think the result is going to be very good. This picture shows the condition shortly afterward (Fig. 310). He was operated on September 3 1917, about six months ago. He has no cast on. He has pretty

good motion of the hip and knee. This picture was taken more recently and shows the graft in place. The angle I believe is pretty well preserved. He has a deformed foot and we cannot predict the degree of usefulness it may reach but I think we did the best thing for him under the circumstances.

CASE XX —Here is a man with an ordinary Pott's fracture. I have already spoken of the importance of having two views



FIG 313. A different type of Pott's fracture in that there is a fracture of the inner malleolus allowing greater displacement of the astragalus outward to the fibular side.

of such fractures. In looking anteroposteriorly you cannot tell that anything has been wrong unless you are careful (Fig 311). That looks all right except the relation of the astragalus to the inner malleolus is not normal. There is some outward displacement there. This lateral view (Fig 312) shows distinctly an oblique fracture of the fibula. There is nothing remarkable about this case; it is a typical fracture of the Pott's variety.



FIG. 314.—Lateral view which gives no *ut* conception as to the amount of deformity. Note the small piece of bone torn from the anterior edge of tibia. Sometimes a large piece is broken off here allowing backward dislocation.

The case shows the value of always having two pictures taken at right angles to one another.

CLINIC OF DR. GEORGE D. J. GRIFFIN

MILKY HOSPITAL

A GENERAL DISCUSSION OF FRACTURES

Summary A case of fracture of femoral shaft with non union—causes of non union—fixation in fractures—the plaster cast versus splints—necessity of early manipulation of joints neighboring line of fracture—early treatment of compound fractures—Keep fingers and fingers out—the Carré-Dakota treatment—proper place of the x-ray in the treatment of fractures—internal fixation—fixation by impaction—foreign body and autogenous bone graft—internal splints

We come today to the general discussion of fractures. I feel that if I occupy some of your time in advance in driving home to you in such a fashion as to impress them indelibly upon your mind some very important points it will be time well spent. Much has been said and written upon this subject. Much will be said and written for a long time to come. Even then much will remain to be emphasized. In no branch of surgery can more glowing results be obtained than in bone work. Likewise in no branch of surgery can more disastrous experience be met, more unsatisfactory results be obtained or more adverse criticism be hurled at a doctor than in the department of bone surgery. I am showing you here as an evidence of this statement four views of a fracture of the femur. The first two pictures (Figs. 315 and 316) were taken last August shortly after the accident. The last two were taken last week (Figs. 317 and 318). This case came to me last week with the history of the injury being the result of an automobile accident. The accident occurred in May 1917. The case has been treated and has been under constant observation. No one can say in any given case why non union results, but I do say that in this case all the elements appeared in favor of union. Nature did



Fig. 314.—Lateral view which gives no just conception as to the amount of deformity. Note the small piece of bone torn from the anterior edge of tibia. Sometimes a large piece is broken off here allowing backward displacement.

The case shows the value of always having two pictures taken at right angles to one another.

CLINIC OF DR GEORGE D J GRIFFIN

GRACE HOSPITAL

A GENERAL DISCUSSION OF FRACTURES

Summary A case of fracture of femoral shaft with non union—causes of non union fixation in fractures—the plaster cast versus splints necessity of early manipulation of joints neighboring line of fracture early treatment of compound fractures—Keep fingers and forceps out the Carrel Dakin treatment proper place of the x ray in the treatment of fractures internal fixation—fixation by impaction—foreign body and autogenous bone-graft internal splints

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her share as she always will if given half a chance. Figures 315 and 316 show an abundance of good callus. When I first saw this case no restraint was worn by the patient except for two or three stiff fiber strips about $1\frac{1}{2}$ inches wide held in place



F. 315



F. 316

Figs. 315 and 316. Transverse fracture of femur a few days after the accident.

by a flimsy cotton bandage. A cast had been worn but was removed three months ago by the attending man's order and the patient was told to walk. From Fig. 315 and 316 you can gain a fair estimate of the patient's ability to use her leg

and you can see the abominable condition in which the limb has been left after nearly one year's treatment. Your results in bone work will stare you in the face. Be careful and cautious but not too much so. Be certain of what should be done and then do it. Have the temerity and courage to back up your convictions. Do not hesitate but set about it at once.

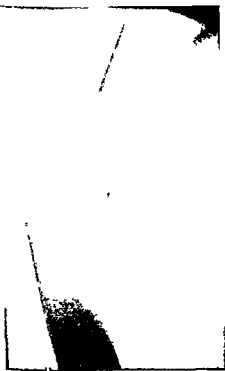


Fig. 317



Fig. 318

Figs. 317 and 318—Same fracture shown in Figs. 315 and 316 but radiographed about one year later. A case of non union.

This brings us to the cause of non union. By far the most frequent cause is the interposition of soft tissue between fragments. You ask, How may we know it is there? In practically every case of fracture with extensive displacement of the frag

her share as she always will if given half a chance. Figures 315 and 316 show an abundance of good callus. When I first saw this case no restraint was worn by the patient except for two or three stiff fiber strips about 1½ inches wide held in place



FL 315



F 316

Figs. 31 and 316.—Transverse fracture of femur a few days after the accident.

by a flannel cotton bandage. A cast had been worn but was removed three months ago by the attending man's order and the patient was told to walk. From Figs. 317 and 318 you can gain a fair estimate of the patient's ability to use her leg

process fracture between the condyles of the humerus and fracture of the internal condyle should be dressed in complete or nearly complete extension

Never fail to move and manipulate joints after the first week or ten days and continue it at regular intervals afterward If you neglect this point ankylosis will be your penalty So much for the conservative treatment of fractures

Before taking up the subject of operative interference I wish to say a few words relative to compound fractures and my first demand of you is this Keep your fingers out If a bone protrudes asepticize it as thoroughly as possible with no handling by fingers and return it Sometimes painting with tincture of iodine will suffice If only a small splinter protrudes with sterile bone clipping forceps clip it off pressing hard on the skin to push out that part which is just under the skin Keep your fingers out of the wound keep your forceps out of the wound unless an artery is lacerated which must be tied keep your probes and drains out of the wound I am thoroughly convinced that a great deal of the infection that occurs in compound fractures is directly traceable to meddlesome interference by us doctors I am so convinced of it that in the compound fractures that come to me and through the corporation work which I do I see many I have adopted a systematic method of treatment If the bone protrudes I follow the advice I have just given If the bone does not protrude I first cover the wound and thoroughly cleanse the surrounding skin removing grease with benzine and alcohol and drying after which I paint a large area with tincture of iodine This removes the possibility of washing foreign matter into the wound If dirt is really ground into the wound I remove it with sterile forceps otherwise I thoroughly infiltrate the wound with tincture of iodine and dress it with no further manipulation After three days if no infection occurs I suture the wound and obtain union by primary intention

I am showing here illustrations of a compound fracture treated according to the technic just given with no infection and primary union of all subcutaneous structures (Figs 319 and

ments soft tissue will find its way between the ends of the bone. If this happens the case must be operated for the osteoblasts from either side will not penetrate the tissue. If the displacement is not marked or if reduction is easily accomplished and maintained there is most probably no tissue between the fragments. These cases can be treated by the conservative method and a good result functional and anatomic will be obtained. Nature is a wonderful surgeon and if given a fair opportunity will do a great deal for you. Among other causes of non union may be mentioned poorly adjusted or improper devices for immobilization. Let me say now. Beware of the complete circular cast. If you must put one on split it as soon as it has hardened. If you do not some day you will have an ischemia of a limb or a paresis from constriction. Likewise I would urge you to refrain from applying a cast for at least three days following the injury. Almost immediately after a fracture swelling occurs and continues for a variable period. If a cast is applied the least to be expected is a poorly adjusted appliance because the cast is gaged to an abnormally large limb and when it resumes its normal condition the cast is loose and non-effective. Another advantage of splitting a circular cast that may be properly mentioned here is that as shrinkage of the part occurs—as it does and will occur in every instance—the cast may be trimmed and so kept close fitting.

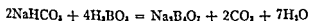
The health of the individual and his metabolic activities are among the factors to be reckoned with in non union.

As to the type of re-traint to be used as a general rule to follow I may say that casts or extension should be applied for all fractures of the lower extremities. For the upper extremities casts may be used with excellent results above the elbow. For fractures of the forearm between the elbow and wrist I prefer splints and I would urge you if you resort to that treatment to use two—one anterior and one posterior—to be readjusted just as often as necessary. Fractures of the elbow require special attention and special adjustment. In the majority of cases the position of acute flexion the so-called Jones position will give the desired result. Fracture of the olecranon

all parts of the wound with a solution of sodium bicarbonate, calcium chlorid, and boric acid in the following proportions

Sodium bicarbonate	18
Calcium chlorid	14
Boric acid	5
Water	1000

The sodium bicarbonate reacts with the boric acid in the following manner to form borax



A further reaction takes place between the borax and chlorid of lime (bleaching powder) thus



In this manner sodium hypochlorite was formed. The chlorine atom was unstable and liberated in a wound, performed its disinfectant and antiseptic function. For the same reason, its instability, fresh solutions were necessary. I will say now that it is not Labarraque's solution and it bears no relationship to it.

Further work brought out the fact that the hypochlorite underwent a chemical reaction in contact with proteins in the wound secretions and formed a chloramin which exerted the germicidal action in an infected wound. Chloramins are the active principles in solution used now in the Carrel Dakin treatment and they are used up to 2 per cent strength. These preparations have great advantages over the first solutions, chief among them being that they are less irritating, possessing practically no irritant qualities, and can be used in greater strength. The original solutions were caustic and irritating to the unbroken skin and necessitated measures of protection. Unquestionably, when properly used the Carrel Dakin treatment is decidedly advantageous. If you recall I stated that the treatment called for the continuous moistening of the wound. I did not use

320) The skin surface sloughed away from the devitalizing effect of the traumatism and delayed work on the bone the fragments of which were locked effectually in displacement. In reference to a possible tetanus infection always follow the rule to give antitetanic serum when in doubt.



Fig 319

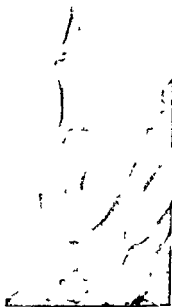


Fig 320

Fig 319—Compound fracture of fifth metacarpal bone

Fig 320—Same case as Fig 319 after supposed reduction. Fixation finally obtained by impaction of the fragments.

I might refer here to the treatment of all wounds in general and compound fractures in particular instituted as a result of war work. I have in mind the Carrel Dakin treatment. Originally, this treatment consisted of the continual moistening of

have used Lane plates in the arm cases. You will from time to time hear Lane plates condemned. I will grant that they are foreign bodies but in about 65 per cent of the cases give

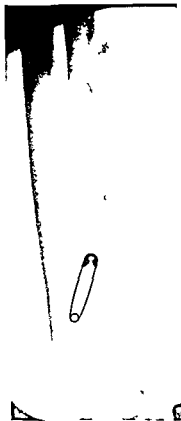


Fig. 321



Fig. 322

Figs. 321 and 322. Fracture of the shaft of the radius before and after fixation by Lane plate.

absolutely no trouble. They are most effectual in holding fractured bones together and in many cases are indispensable. Among the various mechanical methods of holding fractures I will mention the following:

the term "continual irrigation." The treatment consists in regular instillation of the solution into the uttermost depths of the wound at definite intervals, usually two-hour intervals, by a special apparatus, consisting of multiple rubber tubes, in such quantities as to provide constant moisture to the wounded area. In so far as its use in office work is concerned, to clean a wound preparatory to dressing it, or insofar as the single daily irrigation of the part in home or hospital is concerned, I do not believe that the results attained are greatly superior to those obtained by the use of older antiseptics. This much can be said in its favor, it does not lose its efficiency when coming in contact with proteins and albumins. The majority of other chemicals combine with those substances, thereby self limiting their activity. I would condemn the routine irrigation of all wounds from the time of injury. I urge waiting until the early evidences of infection are manifest, and will predict that, if properly handled many wounds in civil practice will not become septic.

I digressed somewhat from my original subject, but I want to impress upon your minds the proper method of handling compound fractures. Always try to reduce a fracture immediately and apply a temporary restraint. Be sure and x ray your fractures after reduction, because only by that method can you determine that reduction has been accomplished. I refer you again to the pictures that I last showed you. The last three pictures were taken after reduction had been attempted. If I had not x rayed this hand I would have been satisfied that I *had brought the fragments in apposition*. If you will look closely you will see that it is impossible to manipulate those fragments into position, because the lower fragment is overriding the upper fragment and is posterior to it. You will see also that the upper fragment is twisted and both have projecting spicules. Here are pictures of fractured forearms taken after reduction had been supposedly accomplished. These patients were under my care from the time of injury and defied my efforts to reduce them (Figs 321, 322). You see here pictures of each case after I operated them. You will notice that I

Wires or kangaroo tendon may be used in fractures of small bones of the foot or hand and in fractures of the patella and clavicle. In all other cases the use of wire is to be deplored. At best it only holds the bones in fair apposition without im-

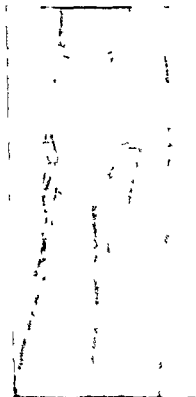


Fig. 323

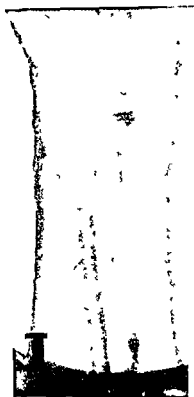


Fig. 324

Figs. 323 and 324 —Fracture of both bones of the forearm. Failure of conservative treatment. Successful reduction by open operation and Lane plate.

mobilization. To accomplish your object in a bone operation immobilization should be secured. The contention has been raised in the past that some motion in a fracture was not only beneficial but desirable, that slight motion stimulated callous

- 1 Bone grafts or transplants
- 2 Bone-plates
- 3 Lane plates—vanadium steel
- 4 Impaction
- 5 Wiring

Among the most spectacular advances in constructive surgery in the past few years may be placed foremost the bone transplant. We have now a method of overcoming persistent non union. When bone is removed from a living extremity there is a coagulation of the cells and vessels of the removed portion through which and around which the lymph is unable to flow. This of course results in the death of the cells in the lacunæ and in the haversian canals. This was most ably brought out and clearly demonstrated by the very recent work of Drs Galle and Robertson of Toronto. They also showed that although the cells die the osteoblasts absorb nutriment and proliferate and are the active factor in the production of new bone in the bed of the transplant. Transplant in my opinion should only be used for old fractures where fibrous or non union exists.

The pictures of the Lane plates show very effectually how they are used and their action. They are purely mechanical restraints and I advocate their use in recent intractable fracture. Bone-plates are not so well known but I believe will ultimately come into more general use. They have the advantage over the Lane plates of being ultimately absorbed.

Frequently cases are met with where it is possible or desirable to impact bones and that by virtue of such impaction remain in position. If this is possible it should be done and the use of any foreign body avoided. I show here the fracture of the metacarpal bone after operation (Figs 323-326). The fragments were covered by muscle tissue as all badly displaced fractures will be. You will see that no wire or restraint was used. This was a case in which I was compelled to use the impaction method to hold the fragments in position. They slipped somewhat, but I shall leave them alone now. Fractures of this kind give more trouble than larger bones and the more interference there is the more unsatisfactory the result.

Wires or kangaroo tendon may be used in fractures of small bones of the foot or hand and in fractures of the patella and clavicle. In all other cases the use of wire is to be deplored. At best it only holds the bones in fair apposition without im-



Fig. 323

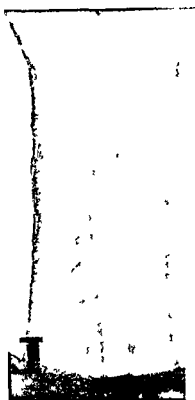


Fig. 324

Figs. 323 and 324—Fracture of both bones of the forearm. Failure of conservative treatment. Successful reduction by open operation and Lane plate.

mobilization. To accomplish your object in a bone operation immobilization should be secured. The contention has been raised in the past that some motion in a fracture was not only beneficial but desirable; that slight motion stimulated callous

formation. This point may be well taken but no one will deny that motion is opposed directly to immobilization and after union the shaft of a bone is immobile. The converse should also be true and is true that if union is desired im-



Fig. 325



Fig. 326

Figs. 325 and 326—Fracture of both bones of the forearm. Failure of conservative treatment. Successful reduction by open operation and Lane plate.

mobilization should be maintained. After operation apply a plaster cast and keep it applied until union is obtained, removing it only to massage the parts or to manipulate joints.

By way of closing I want to caution you against carelessness or indifference or negligence of technic in bone operations.

Bones have not the same resistance to infection that soft tissues have. The saprophytes of the air may even inaugurate an infection that will bring to naught all your work. Keep your fingers out. Keep them off the parts of the instruments that come in contact with the wound. Handle your plates, screws, sponges, ligatures, everything in fact with forceps. Also do not be in a hurry to operate upon a compound fracture. Wait until the soft parts have completely healed. And never, never operate on a bone in the presence of an active suppurating infection. It may prove disastrous, and the least you can possibly hope for will be a sloughing of the transplant, or the necessity of reopening and removing your plates to cure a sinus, and in the end you will find that you have accomplished nothing because bone will not unite in the presence of an infection. Wait. Let the infection subside, and you will be fully repaid for the delay by the knowledge of your work well done. That in itself will often be the greatest reward and greatest recompense you can be given. There will be a feeling of internal satisfaction that even King Midas' gold could not bring you.

GYNECOLOGY

and

OBSTETRICS

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